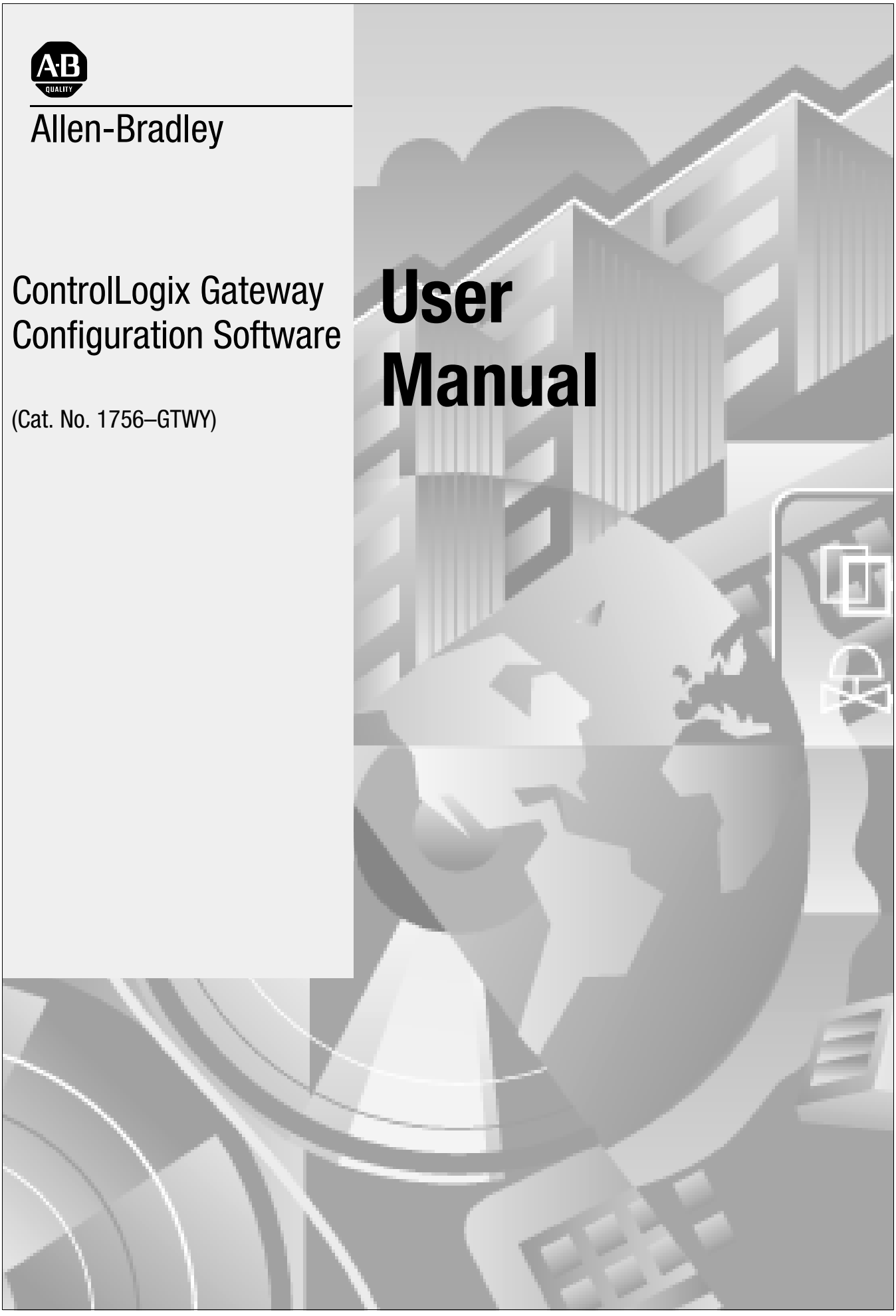

Allen-Bradley

ControlLogix Gateway Configuration Software

(Cat. No. 1756–GTWY)

User Manual

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines For The Application, Installation and Maintenance of Solid State Control* (available from your local Allen-Bradley office) describes some important differences between solid-state equipment and electromechanical devices which should be taken into consideration when applying products such as those described in this publication.

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Throughout this manual we use notes to make you aware of safety considerations:

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention helps you to:

- identify a hazard
- avoid the hazard
- recognize the consequences

Important: Identifies information that is critical for successful application and understanding of the product.

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ControlNet is a trademark of ControlNet International.
Ethernet is a registered trademark of Digital Equipment Corporation, Intel, and Xerox Corporation.
RSLinx is a trademark of Rockwell Software, Inc.
Windows NT is a trademark of Microsoft Corporation.

Introduction

This release of this document contains new or updated information.To help you find the new and updated information, look for change bars. The change bar appears in the page margin as shown here.

Information Added or Changed

The following changes were made to this publication:

- References to SuperWho were changed to RSWho version 2.0.
- Chapter 1 has a new ControlLogix™ Gateway system graphic and additional publication information is listed.
- Chapter 9 was revised with routing table examples for communicating between devices on Ethernet®, ControlNet™, and Data Highway Plus™ networks.

Using This Manual

This preface explains how to use this manual most effectively.

For information about	See page
the purpose of this manual	P–1
who should use this manual	P–1
where to find more information	P–1
what this manual contains	P–2
the vocabulary used in this manual	P–2
additions or changes to this manual	P–2

Purpose of This Manual

This manual shows you how to use the ControlLogix Gateway Configuration Software to:

- get information about your ControlLogix modules
- set or change the configuration of Ethernet or DHRIO modules
- save and restore configuration data

Who Should Use This Manual

This manual assumes that you:

- are familiar with Microsoft Windows NT™ and are familiar with terms that describe what you should be doing when working in Windows NT, e.g., double-click, dialog box, radio checkbox
- understand Data Highway Plus, ControlNet, and Ethernet networking concepts
- are familiar with routing concepts

If you are not familiar with these concepts or would like additional information, see the references listed in the next section or contact your Rockwell Automation representative for information about available training.

Where to Find More Information

You can refer to the following publications for help with the ControlLogix Gateway system:

For information about	See this publication	Publication number
the ControlLogix Gateway system	ControlLogix Gateway System User Manual	1756-6.5.12
the Ethernet Communication Interface Module	Ethernet Communication Interface Module User Manual	1756-6.5.1
Data Highway Plus communication	Data Highway Plus Communication Interface User Manual	1756-6.5.2
RSLinx™ Lite	RSLinx Lite User's Guide	9399-WAB32LUG
the ControlLogix DH+™/Remote I/O Communication Interface Module	ControlLogix DH+/Remote I/O Communication Interface Module User Manual	1756-6.5.14

What This Manual Contains

This manual contains these chapters and appendices:

Chapter or Appendix	Title	Describes
1	Introducing the Software	the ControlLogix Gateway and the configuration software. Provides a typical system diagram and defines key concepts.
2	Installing the Software	how to install the software.
3	Working With Configuration Files	how to work with configuration files, including: • starting the software • creating a new configuration file • opening an existing configuration file • going online to monitor or configure a module • closing a configuration file • saving module configurations in a file • restoring module configurations from a saved file • printing configuration information • accessing online help
4	Viewing General Information About the Module	how to view product, status, and channel information about a module.
5	Monitoring Module Status	how to monitor module status.
6	Viewing Connection Manager Information	how to use the connection manager to view diagnostic information about a module.
7	Viewing Backplane Diagnostic information	the ControlLogix backplane. Describes how to view backplane diagnostic information about a module.
8	Changing a Module's Configuration Information	how to configure 1756-ENET and 1756-DHRIO modules.
9	Designing a Routing Table	what a routing table is. Describes how to enter and modify a routing table. Provides an example/tutorial.
A	Configuration Software Error and Warning Messages	error and warning messages and provides some troubleshooting tips.
B	Using Diagnostic Counters	diagnostic counters provided with the configuration software.
C	Using the Configuration Software with RSWho	how to more effectively use the configuration software with RSWho version 2.0.

▶ These instructions assume the $3^1/_2$-inch diskette is to be inserted into drive ***a*** of your computer. If drive ***a*** is not used, replace the ***a*** in these instructions with the appropriate drive designation.

Vocabulary

In this document, we refer to the ControlLogix Gateway Configuration Software as the *configuration software.*

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Introducing the Software

What's in This Chapter?

This chapter provides an introduction to the ControlLogix Gateway Configuration Software.

For information about	See page
the ControlLogix Gateway	1–1
the ControlLogix Gateway Configuration Software	1–2
a typical ControlLogix Gateway system	1–6
changing software mode	1–7
key concepts for configuration	1–8
system requirements	1–9

What Is the ControlLogix Gateway?

The ControlLogix Gateway lets you bridge and route control and information data through these Allen-Bradley networks:

- ControlNet™ networks
- Ethernet® networks
- Data Highway Plus™ networks

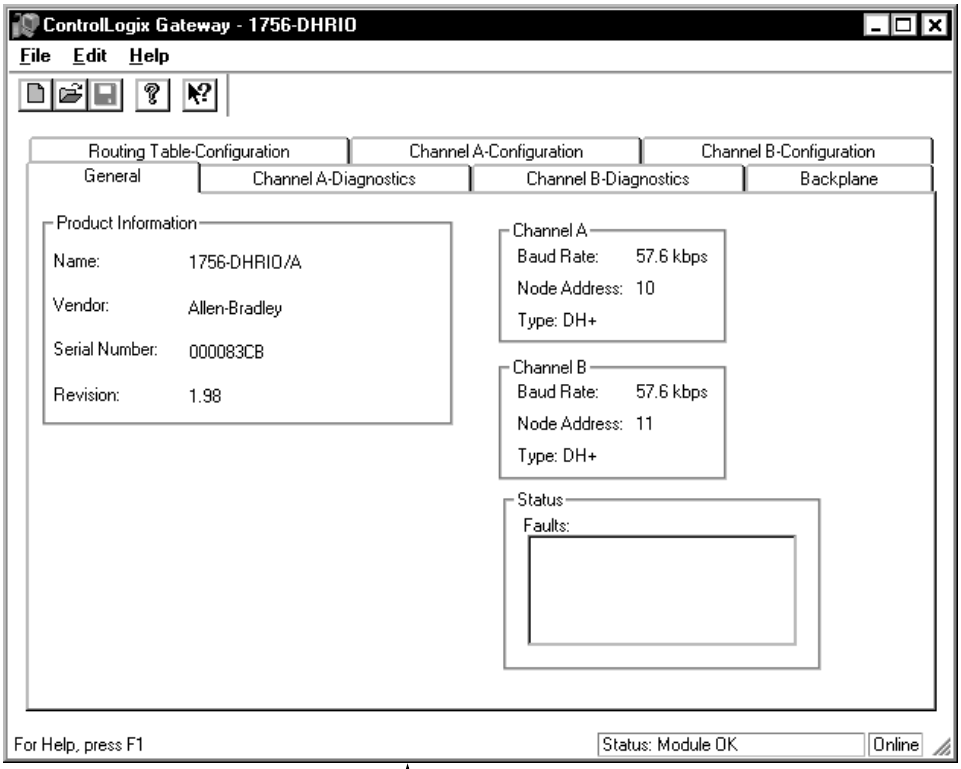
With the ControlLogix Gateway, you can:

- place communications modules in any slot without the need for a processor in the chassis
- expand your system by adding as many or as few networking modules as needed
- determine the type and number of networking modules inserted in the chassis
- configure a routing table in the 1756-DHRIO module to allow communications between devices on Ethernet, ControlNet, and Data Highway Plus networks

What Is the ControlLogix Gateway Configuration Software?

The ControlLogix Gateway Configuration Software (catalog number 1756-GTWY) provides you with the following information about your ControlLogix modules:

- general module information



The status bar includes three panels:

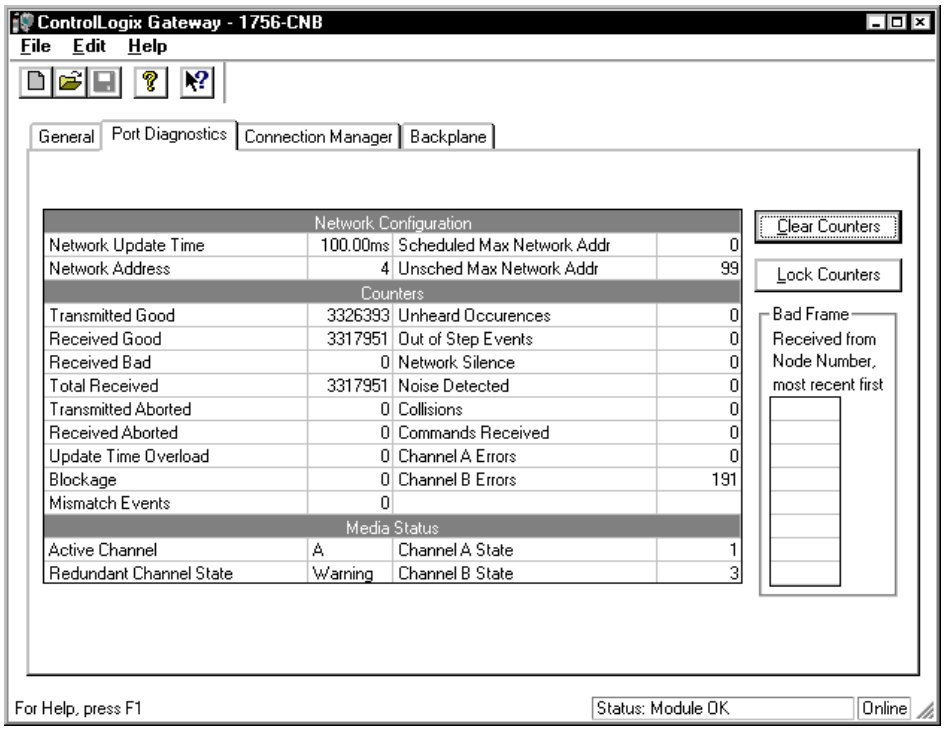
The **left** panel displays general status information, such as the progress of an operation.

The **middle** panel displays the highest fault level that has occurred. This panel is displayed only in online mode. The order of fault levels is:

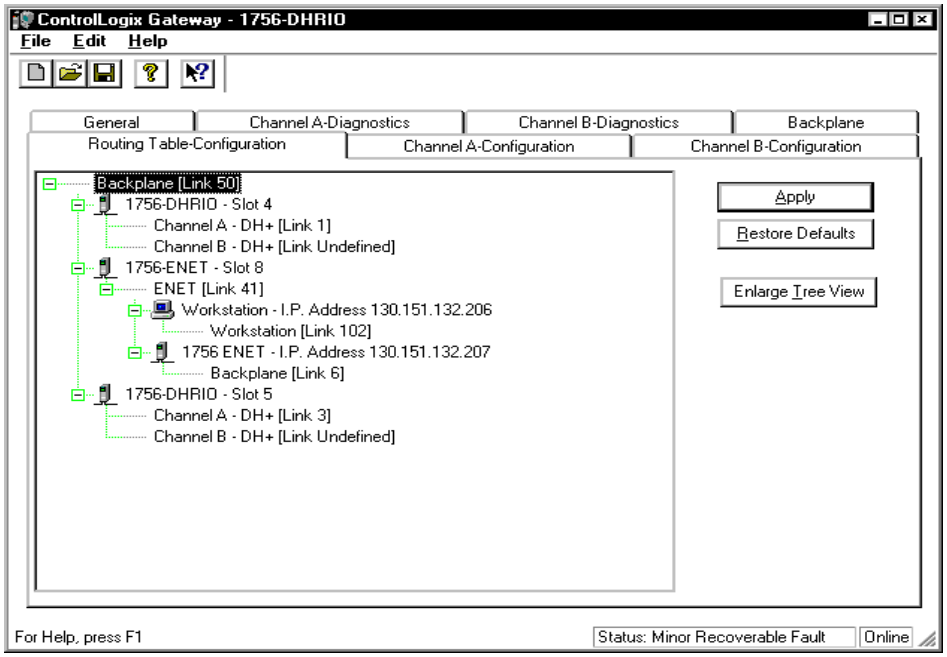
- major non-recoverable fault
- major recoverable fault
- minor non-recoverable fault
- minor recoverable fault

The **right** panel displays the current mode, i.e., online or offline.

- status and diagnostic information

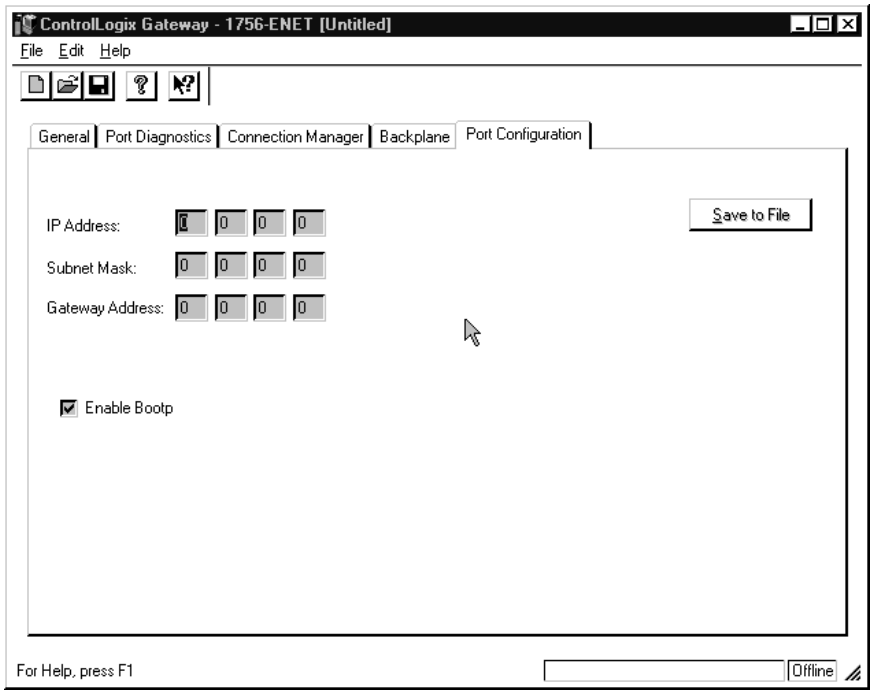


- configuration routing information

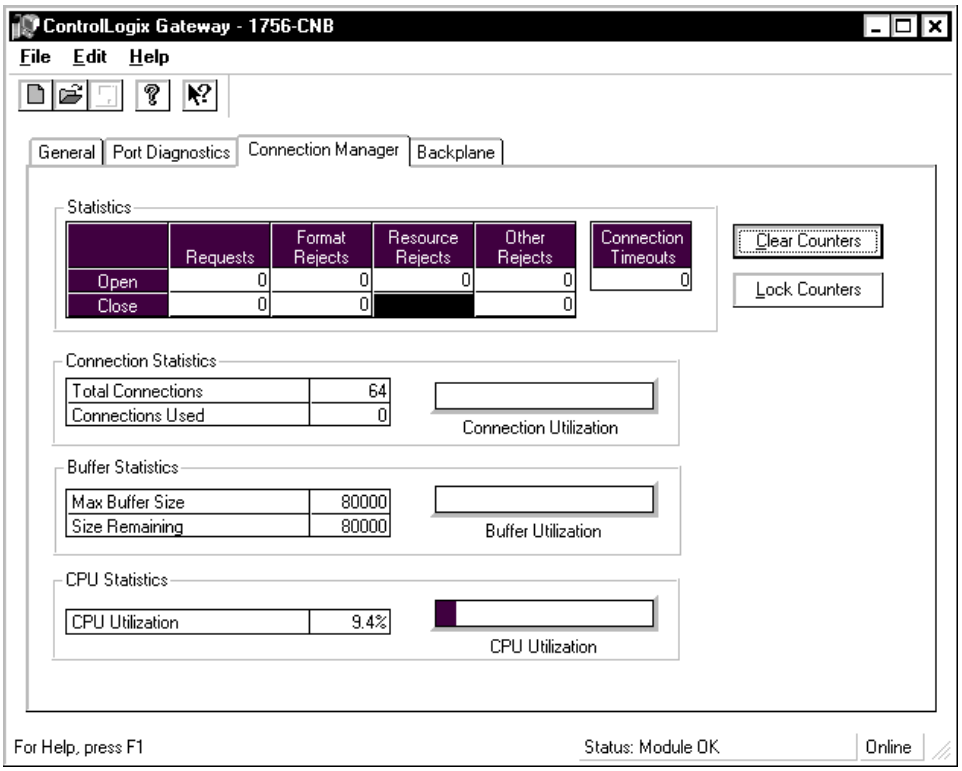


In addition, it lets you:

- set or change the configuration of Ethernet or DHRIO modules

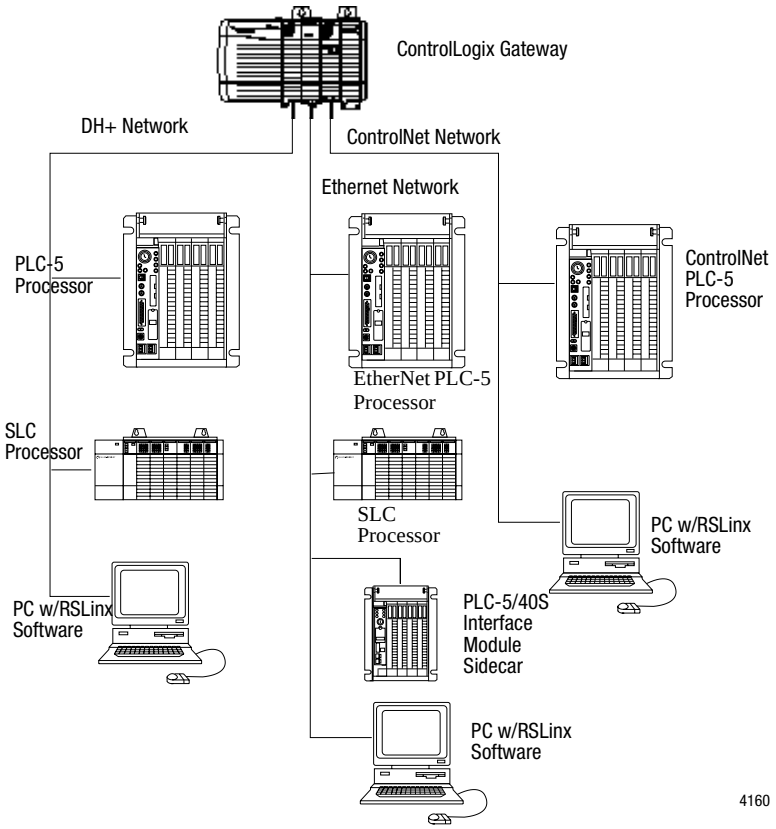


- access diagnostic information on ControlNet Communication Interface modules



Important: This software does not configure the ControlNet operational parameters; you can set the module's network address on the ControlNet network through the hardware or use RSNetWorx to configure ControlNet operational parameters. The ControlNet default values are adequate for many typical ControlLogix Gateway applications.

A typical ControlLogix Gateway system might include the following:



The following table lists catalog numbers for the main ControlLogix system components:

Catalog number	Product name	Description
1756-ENET	Ethernet Communication Interface Module	let you bridge and route control and information data through Allen-Bradley ControlNet, Ethernet, and Data Highway Plus networks.
1756-DHRIO	Data Highway Plus Communication Interface Module	
1756-CNB, -CNBR	ControlNet Communication Interface Module	
1756-PA72, -PB72	ControlLogix Power Supply	provides power to the ControlLogix Gateway system.
1756-A4, -A7, -A10	ControlLogix Chassis	houses the ControlLogix Gateway system modules.
1756-GTWY	ControlLogix Gateway Configuration Software	provides status, configuration, and diagnostic information about the modules in the ControlLogix Gateway system and lets you set or change their configuration.

Changing Software Mode

You can run the configuration software on line or off line. To view the current mode, check the status bar.

Online Mode

When you configure modules using the RSWho application, you are in online mode. When you are in online mode, you are communicating over the network with the selected module and can perform the following functions:

- read device identification information
- read status information
- read configuration data
- write configuration data
- save configuration data

When you are in online mode, you are working on a specific module through a network connection. Make sure you are the only one working on that specific module; failure to do so could result in loss of data. Any changes to the existing configuration could result in the loss of communication for any application or device currently using the module.

Offline Mode

When you are in offline mode, the ControlLogix Gateway Configuration Software is not communicating over the network; thus:

- the information that you see will be general and configuration information, not diagnostic information
- you can save configuration data
- you can edit the configuration data

Workflow Processes

To further distinguish online and offline development, we provide the following example workflows. For information on developing a configuration, see chapter 3.

Online development	Offline development
1. Go on line.	**1.** Create a new configuration file off line.
2. Configure module(s).	**2.** Save the configuration file.
3. Save module data in a file.	**3.** Go on line.
	4. Select “Send File to Module”.

ControlLogix Configuration Concepts

The following table describes concepts key to understanding the ControlLogix Gateway Configuration Software:

Concept	Description
configuring a module	You can use the configuration software to specify port values for the Ethernet and DHRIO modules.
ControlLogix modules	Modules that can reside in a ControlLogix chassis.
gateway	A gateway connects individual physical networks into a system of networks. When a node needs to communicate with a node on another network, a gateway transfers the data between the two networks.
monitoring a module	Use the configuration software to view diagnostic information for your ControlLogix modules.
online and offline	See the discussion about changing software mode on page 1–7.
routing tables	To configure a DHRIO module, you must provide a path or route, which specifies a “map” to other links in the system. To do this, you must set up a routing table. The routing table translates link ID and node address information into path or routing information. Routing tables are set up at each node to build accurate connections.
saving and restoring	You can use the configuration software to save configuration data to a file; you can later send this configuration data to a module. You can also use the software to upload configuration data from a saved file; configuration data is retrieved from a file and can be sent to a module.
RSWho application	Application that searches over a network to locate modules within a chassis. This application provides information about modules within that chassis.

System Requirements

To use the ControlLogix Gateway Configuration Software, your system must meet these requirements:

Hardware	processor	486 computer with 66 MHz or greater processor
	RAM	at least 16MBytes
	hard disk space	hard drive with adequate free space (10 MBytes or greater)
	disk drive	1.44 MByte disk drive (for installing the configuration software)
	resolution	VGA or higher-resolution adapter/monitor (640x480, 800x600, 1024x786 modes supported) We recommend a Super VGA (SVGA) resolution adapter/monitor.
	peripherals	Windows-supported pointing device
Software	operating system	Microsoft Windows® NT™ v4.0 or later
	communication software	RSLinx v.2.0 or later (included with catalog number 1756-GTWY)

What's Next?

In the next chapter, we describe how to install the software.

Installing the Software

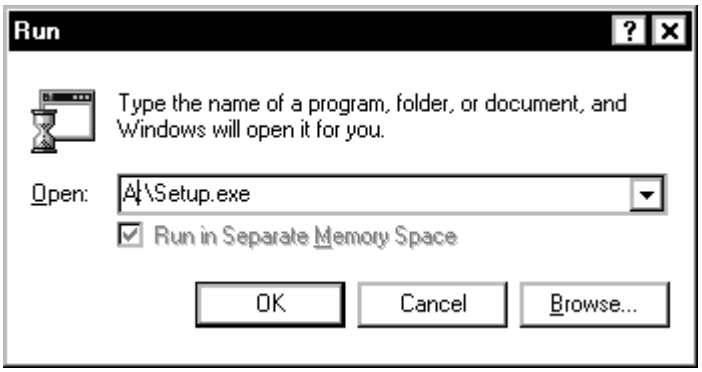
What's in This Chapter?

This chapter describes how to install the ControlLogix Gateway Configuration Software. It also provides a directory of the files installed.

Installing the Software

To install the configuration software, do the following:

1. Insert disk 1 of catalog number 1756-GTWY into your disk drive.
2. Click on **Start**, and select **Run**.
3. In the **Run** dialog box, type ***a*:\setup**, where ***a*** is the drive letter assigned to the disk drive into which you inserted the disk.



4. Click on **OK**, and wait while the configuration software is installed.

   The setup program will prompt you to insert each disk in the installation set. Once the software is successfully installed, you see a prompt indicating that setup is complete.

Installing RSLinx

After the configuration software is installed, you will need to install **RSLinx v.2.0**. If **RS**Linx is already installed, you can start the configuration software.

For instructions on installing and using **RS**Linx, refer to the **RS**Linx User Manual, publication 9399-WAB32UG, included with the 1756-GTWY product.

What Files Are Installed?

During installation, the following files are copied to your system from the installation disks:

These files	Are copied into this directory
1756gtwy.exe	c:\Program Files\Allen-Bradley\ControlLogix Gateway[1]
rxonline.dll	
resources.dll	
1756gtwy.cnt	
1756gtwy.hlp	
Comctl32.ocx	c:\Winnt\System32[2]
Gauge32.ocx	
Threed32.ocx	
Vsflex32.ocx	
Mfc42.dll	
Ctl3d32.dll	
Msvcrt.dll	
Msvcrt20.dll	
LMscrt40.dll	
Olepro32.dll	

1. This is the default path for the installation directory. You may have named this directory differently.
2. This is the default path for the Windows NT system32 directory. You may have named this directory differently.

▶ The following two files are not copied to your system during installation:

- readme.doc
- guide.doc

These files comprise the read-me document included with the configuration software.

What's Next?

In the next chapter, we describe how to work with configuration files, including:

- starting the software
- creating a new configuration file
- opening an existing configuration file
- going on line
- going on line to monitor or configure a module
- closing a configuration file
- saving module configurations in a file
- restoring module configurations from a saved file
- printing configuration information
- accessing the online help

Working with Configuration Files

What's in This Chapter?

This chapter describes how to work with configuration files.

For information about	See page
starting the software	3–1
creating a new configuration file	3–1
opening an existing configuration file	3–2
going on line	3–3
closing a configuration file	3–4
saving module configurations in a file	3–4
restoring module configurations from a saved file	3–5
printing configuration information	3–6
accessing online help	3–7

Starting the Software

After you have successfully installed the software, you're ready to get started:

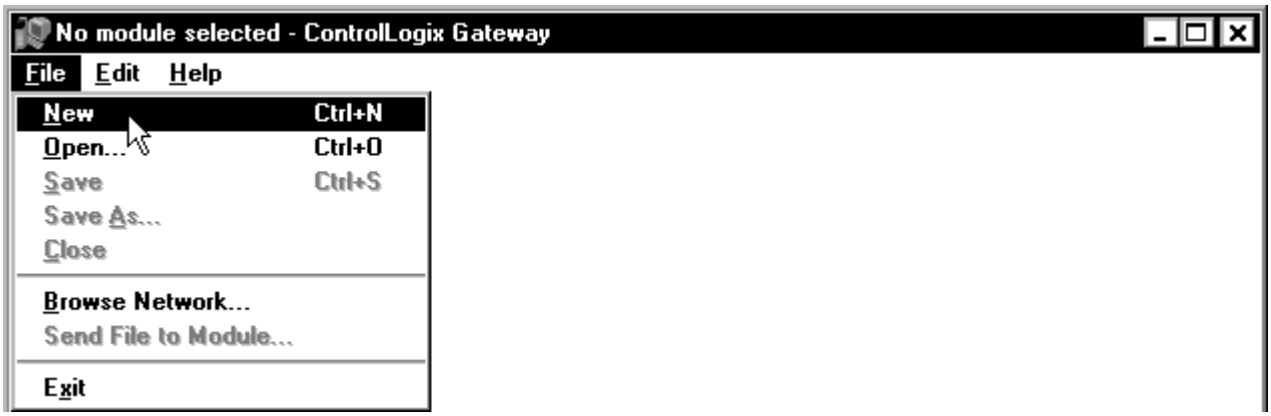
1. From the **Start** button, select **Programs**.
2. Select **ControlLogix Gateway**, then select **1756gtwy**.

Creating a New Configuration File

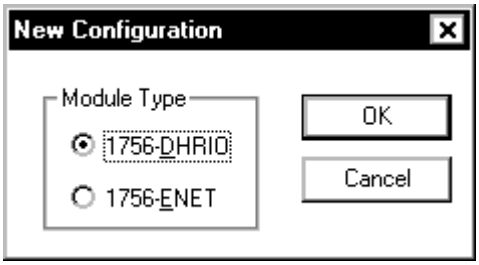
To create a new Ethernet or DHRIO configuration file:

1. If it is not already started, start the configuration software.

   You see the ControlLogix Gateway screen.
2. From the ControlLogix Gateway screen, from the **File** menu, select **New**.



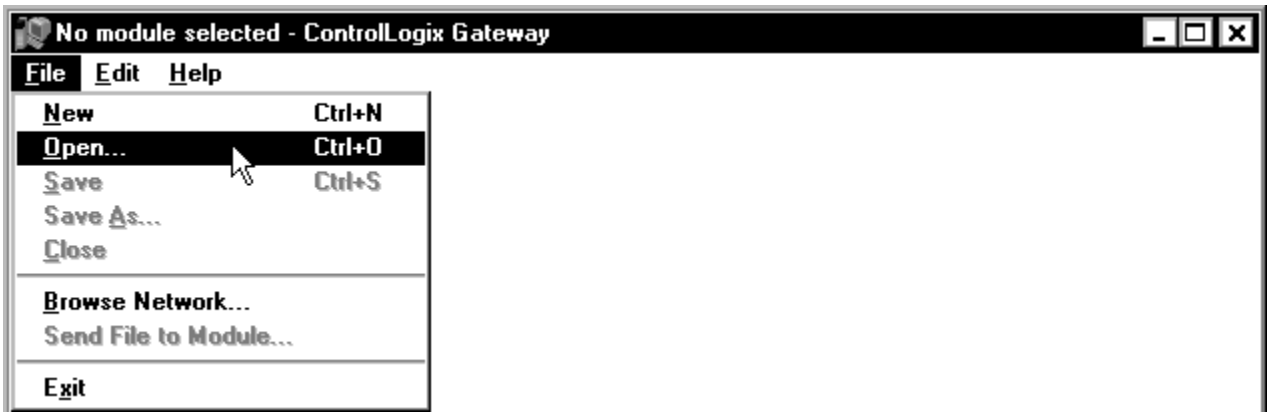
3. In the **New Configuration** dialog box, select a module type, and click on OK.



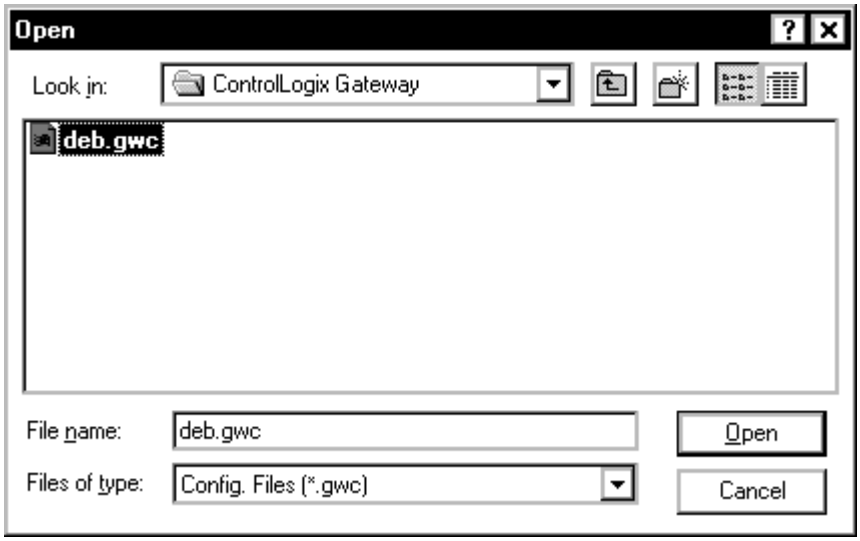
Opening an Existing File

If your ControlLogix Gateway chassis contains a 1756-ENET or 1756-DHRIO module and you want to restore configuration data or change a module's configuration information, open the configuration file that corresponds to that module. To open an existing configuration file:

1. If it is not already started, start the configuration software.
2. From the ControlLogix Gateway screen, from the **File** menu, select **Open.**



3. In the **Open** dialog box, search for the ControlLogix Gateway Configuration Software file that you want to open. All configuration software files end with the .gwc extension.



4. Select the file you want to open, and click on **Open**.

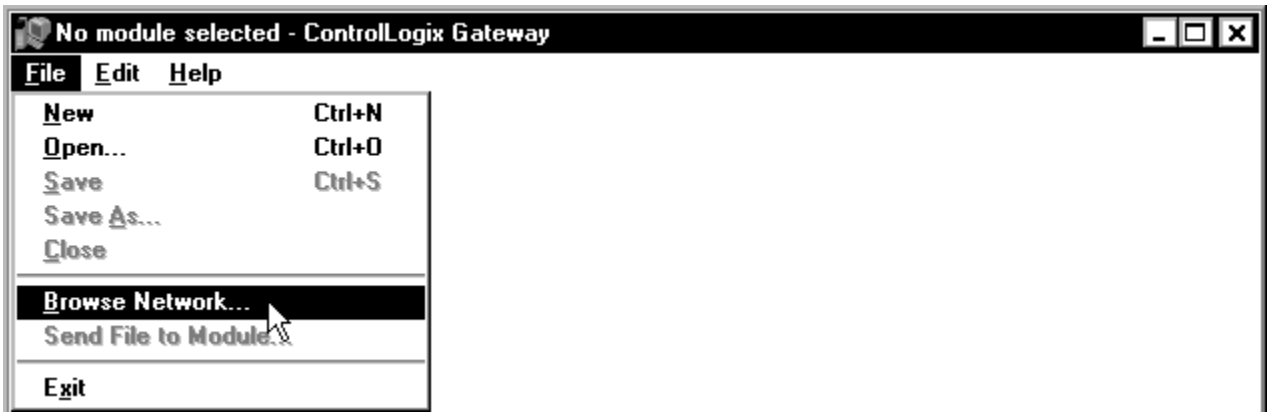
5. This opens an existing configuration file. To view configuration data or monitor diagnostic information for any of the modules in the system, select the appropriate tab.

Going On Line

To browse the network and search for a module:

1. If it is not already started, start the configuration software.

2. From the ControlLogix Gateway screen, from the **File** menu, select **Browse Network**.



This selection starts the RSWho application in RSLinx, which lets you use RSLinx to view modules in the selected ControlLogix Gateway system.

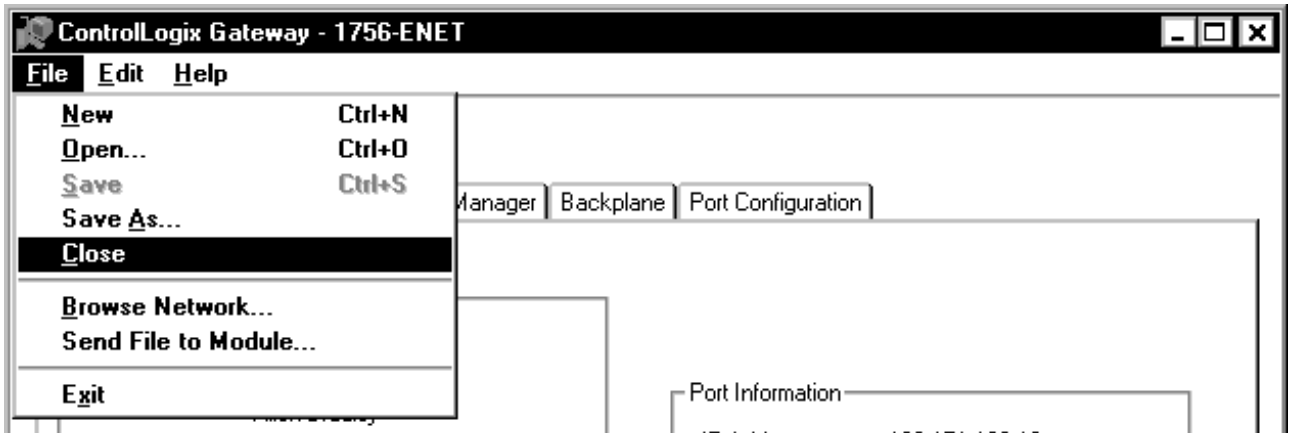
3. To view configuration data or monitor diagnostic information for any of the modules in the system, select the module and double-click on it.

For detailed instructions on using the RSWho application, refer to the **RS**Linx User Guide, publication 9399-WAB32LUG, or the RSLinx online help.

Closing a Configuration File

When you finish editing a configuration file off line, to close the configuration file:

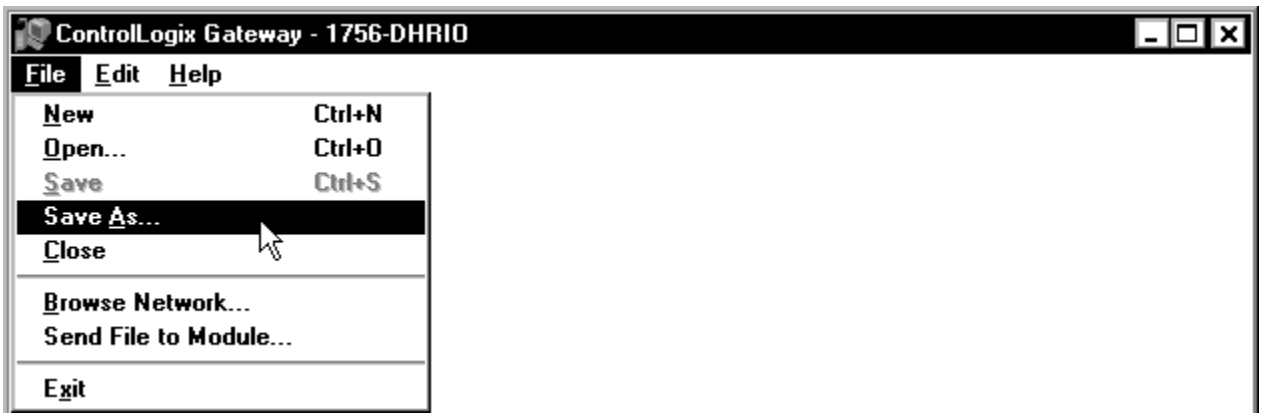
From the ControlLogix Gateway screen, from the **File** menu, select **Close.** If you have not saved the configuration file, you will be prompted to do so.



Saving Online Module Configurations in a File

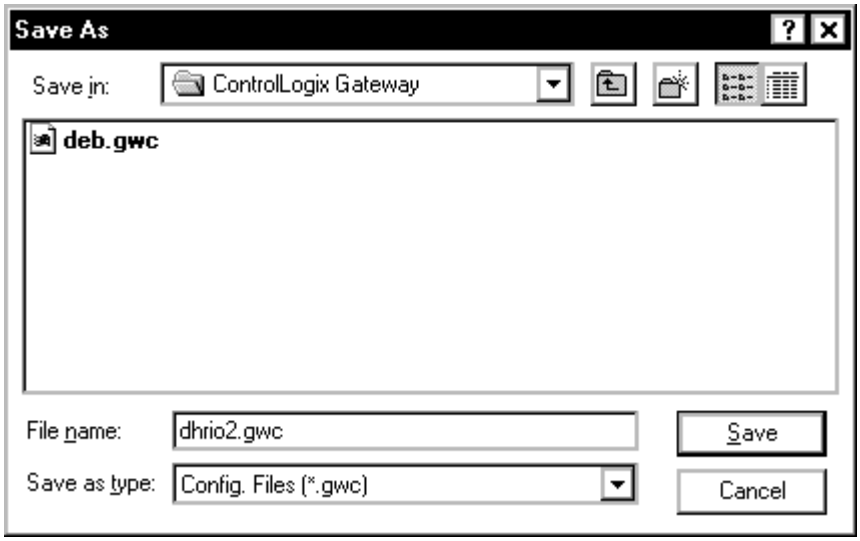
In case you ever need to replace a module, we recommend that you save the module's configuration on disk.

1. Go on line by using **Browse Network** (see page 3–3).
2. From the **File** menu, select **Save As**.



3. In the **Save As** dialog box, type the name for your file (or select an existing file name).

   Make sure your file name ends in the .gwc extension.



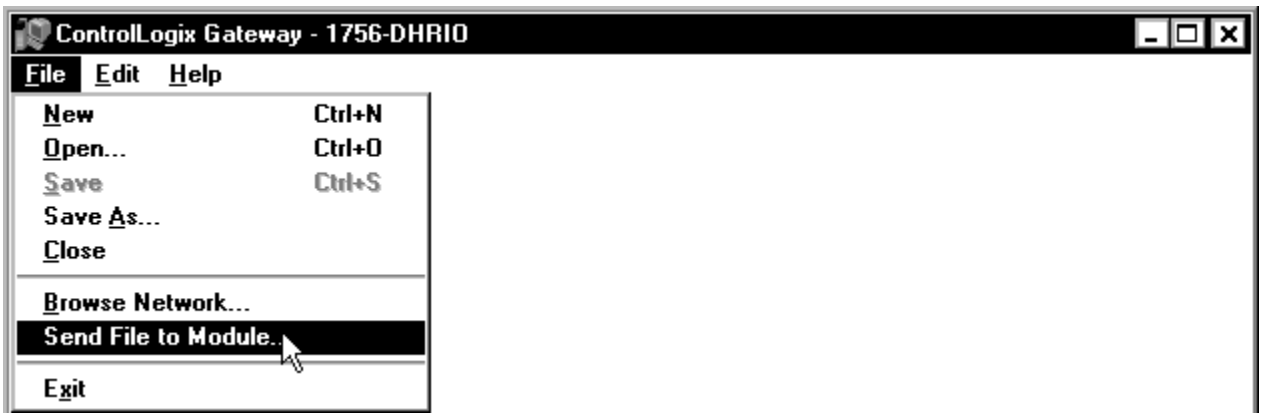
4. Click on **Save**.

   The configuration software saves the configuration data to the specified file.

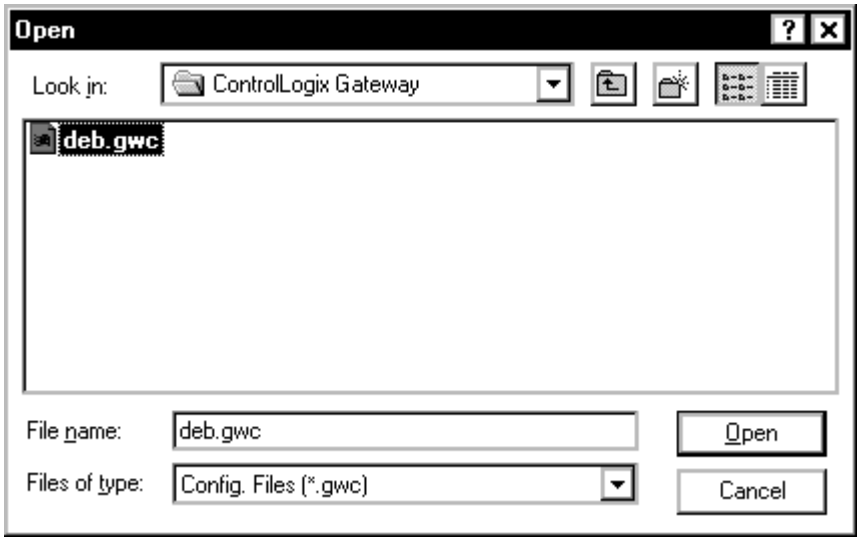
Restoring Module Configurations from a Saved File

You can use the configuration software to restore module configurations from a saved file to a module.

1. Go on line. (See page 3–3.)
2. From the **File** menu, select **Send File to Module**.



3. In the **Open** dialog box, select the file you want to download to the module.



▶ In release 1.8 and all subsequent releases of the configuration software, the “Open” button is labelled “Send.”

4. Click on **Open** .

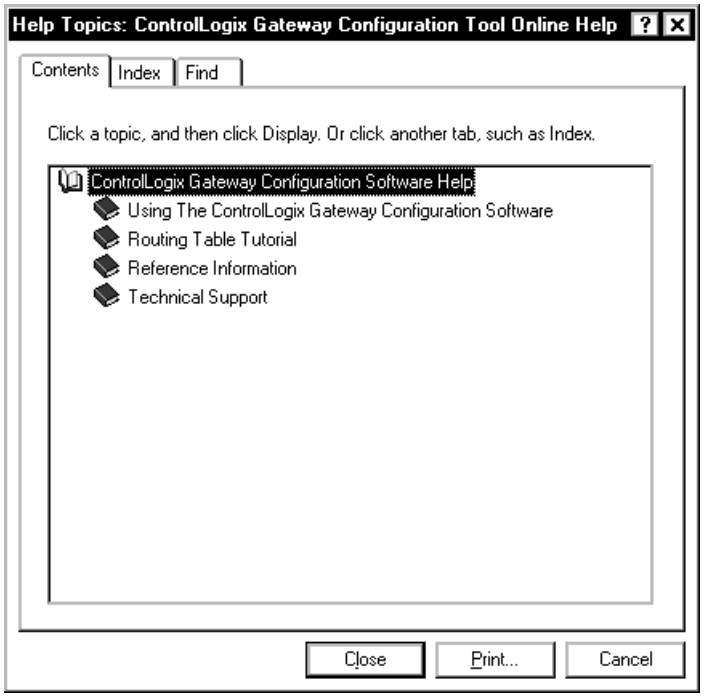
   The configuration software sends the configuration data to the module.

Printing Configuration Information

The configuration software does not support printing. Instead, you can press **[Alt][PrintScrn]** to copy the screen’s contents to the clipboard and then paste those contents in the Windows NT paint accessory.

Accessing Online Help

The configuration software includes online help to aid you in completing your tasks. To access the help, select from the Help pull-down menu. You see a list similar to this one:



To get help on a particular topic or window, click on , then click on the item you want help on, or press F1 when the window you want help on is displayed.

What's Next?

In the next chapter, we explain how to view general information about the module, including:

- product information
- status information
- channel information

Viewing General Information About a Module

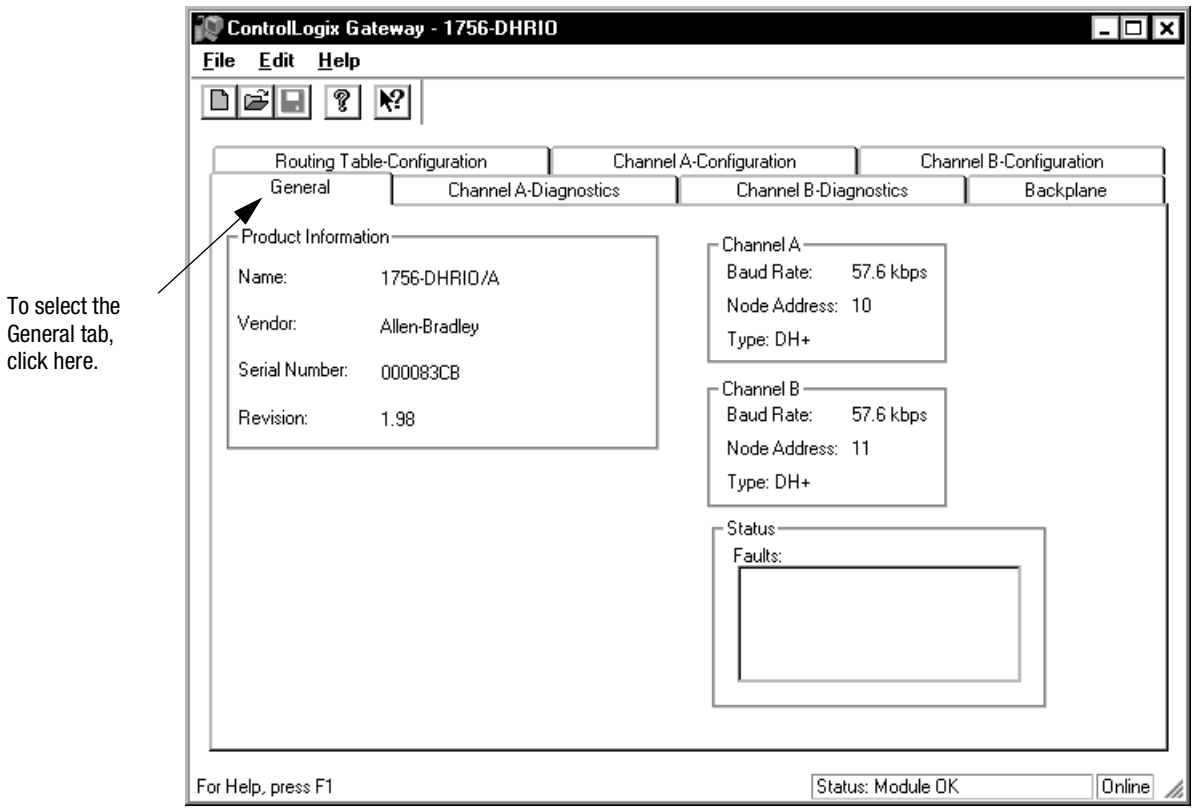
What's in This Chapter?

This chapter describes how to view general information about a module.

Viewing General Information About a Module

1. If it is not already started, start the configuration software, connect to a chassis, and select a module.
2. Select the **General** tab.

   You see a screen similar to the one below:



The General tab provides the following information about the ControlLogix modules:

This field		Contains this information
Product Information		Name - Product Name Vendor - Manufacturer name Serial Number - Module-specific serial number Revision - Module-specific revision number
Status Information		Fault Information - Lists most recent faults
Channel Information	1756-ENET	IP Address - Lists value for current IP address of the Ethernet module
	1756-DHRIO	For each channel: • Baud Rate - Set at 57.6K Baud for DH+ or 57.6, 115.2, or 230.4 for RIO. • Node Address - Set by switches on the module • Type - DH+ or remote I/O
	1756-CNB	Network Address - Lists value for configured network address. You set this address with the switches on the module.

What's Next?

In the next chapter, we explain how to monitor module status.

Monitoring Module Status

What's in This Chapter?

This chapter describes how to monitor module status.

Monitoring a Module

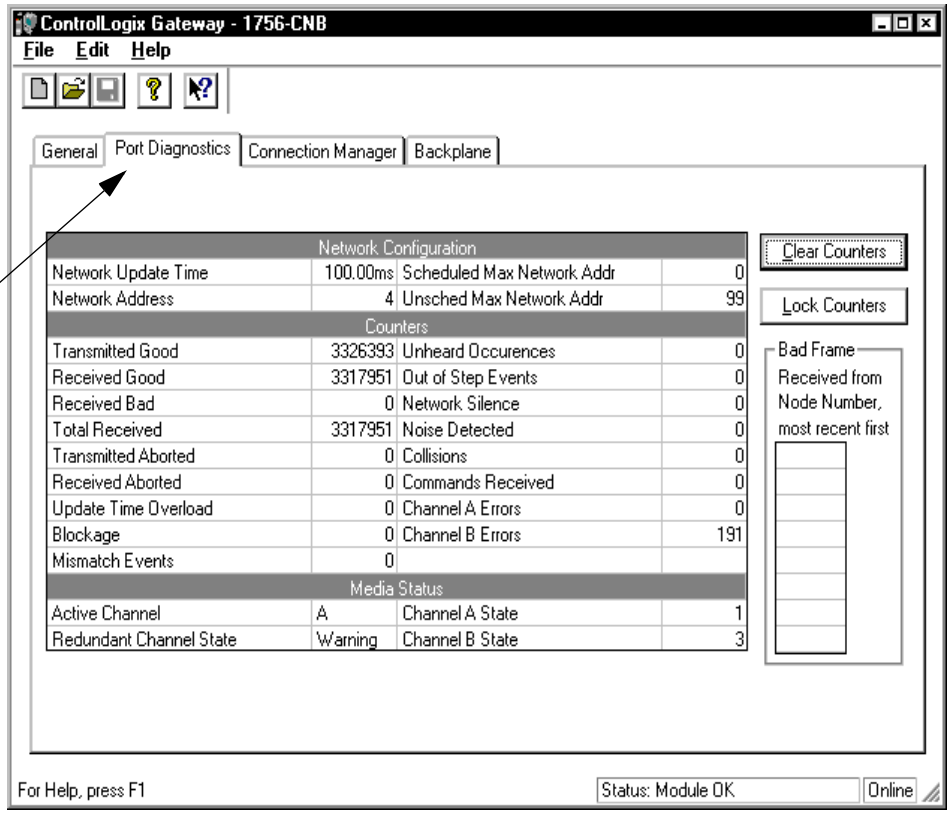
You can use the configuration software to monitor the status of a ControlLogix Gateway module.

Important: You cannot use the configuration software to configure ControlNet modules. You can set the module's network address on the ControlNet network through the hardware. The ControlNet default values are adequate for many typical ControlLogix Gateway applications. Though you cannot configure a 1756-CNB module with the configuration software, you can monitor its status.

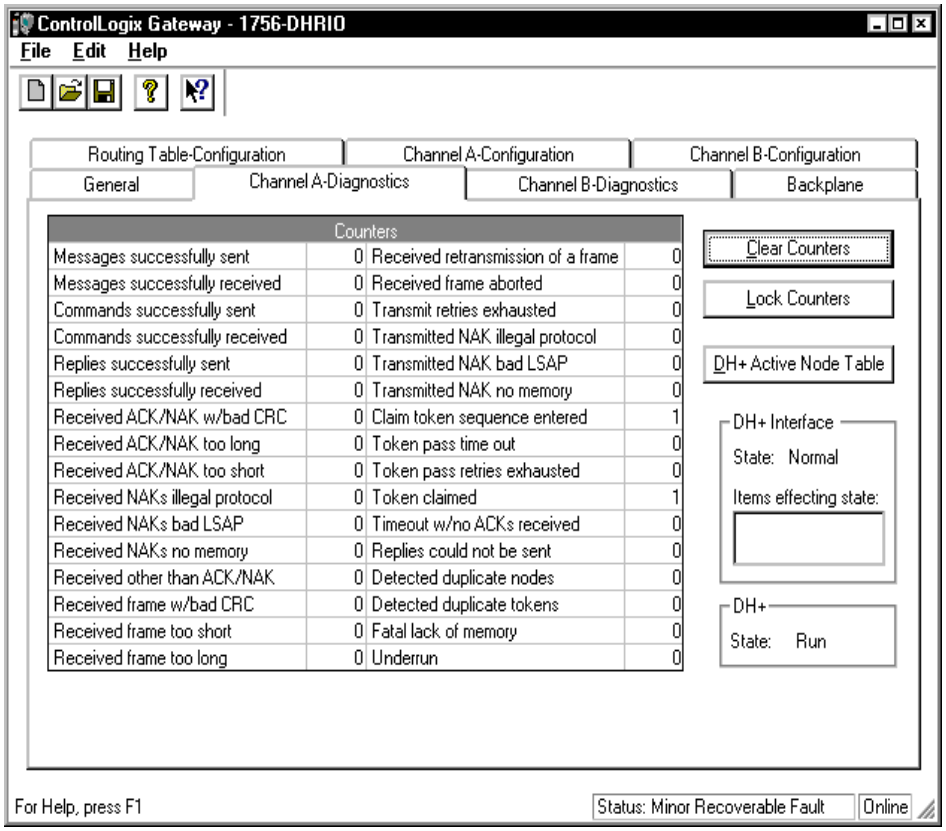
1. To start the configuration software and select a module, follow the instructions in chapter 3.
2. Select a **Port Diagnostics** tab.

You see a list of counter values similar to the one below:

To select the Port Diagnostics tab, click here.



The figure below provides an example of a 1756-DHRIO Channel Diagnostics screen.



Each module type displays diagnostics appropriate to the type of communications channels on that module.

For descriptions of the diagnostic counters, refer to the ControlLogix Gateway Configuration Software online help. (For instructions on starting the help, see page 3–7.) These counters are also listed in Appendix B.

Locking and Unlocking Counter Displays

To lock or unlock the diagnostic counters, you must be on a port diagnostics, Connection Manager, or Backplane tab. To hold the counter display at the current value, select the Lock Counter button.

When you select the Lock Counters button, the counters within the module continue to increase. The display updates after you select this button again.

This button serves as a toggle for locking and unlocking the diagnostic counter displays. This means that the first time you select it, the displays are locked; the second time that you select it, the displays unlock.

Clearing Counters

To clear the diagnostic counters, you must be on a port diagnostics, Connection Manager, or Backplane tab. To reset the counters to zero, select the Clear Counters button.

After you select the Clear Counters button, the software continues polling the module once every second and updates the diagnostic counters.

Checking the DH+ Interface Group Box

The DH+ Interface group box displays the current state of the DH+ Interface object and any items affecting the state. Normal states for these items are:

The normal state for this	Is this
DH+ Interface object	Normal
DH+ entry	Run

If you see "Waiting" as the current state, the front display on the module will show "CNFG FALT" for that channel. If the state is "Waiting," you will see one or both of the following in the Items Affecting State dialog box:

If you see this	Do this
DH+ object	**1.** Select the **Channel Configuration** tab. **2.** Make sure you've entered a value or the controller slot. **3.** Click on **Apply**. or Click on **Restore Defaults.** This will change the DH+ state on the Channel Diagnostics tab to "Run."
Routing Table	**1.** Select the **Routing Table - Configuration** tab. **2.** Enter and apply a routing table. or Click on **Restore Defaults**.

▶ You can also select **Send File to Module** to correct both error messages.

What's Next?

In the next chapter, we explain how to view Connection Manager diagnostic information.

Viewing Connection Manager Information

What's in This Chapter?

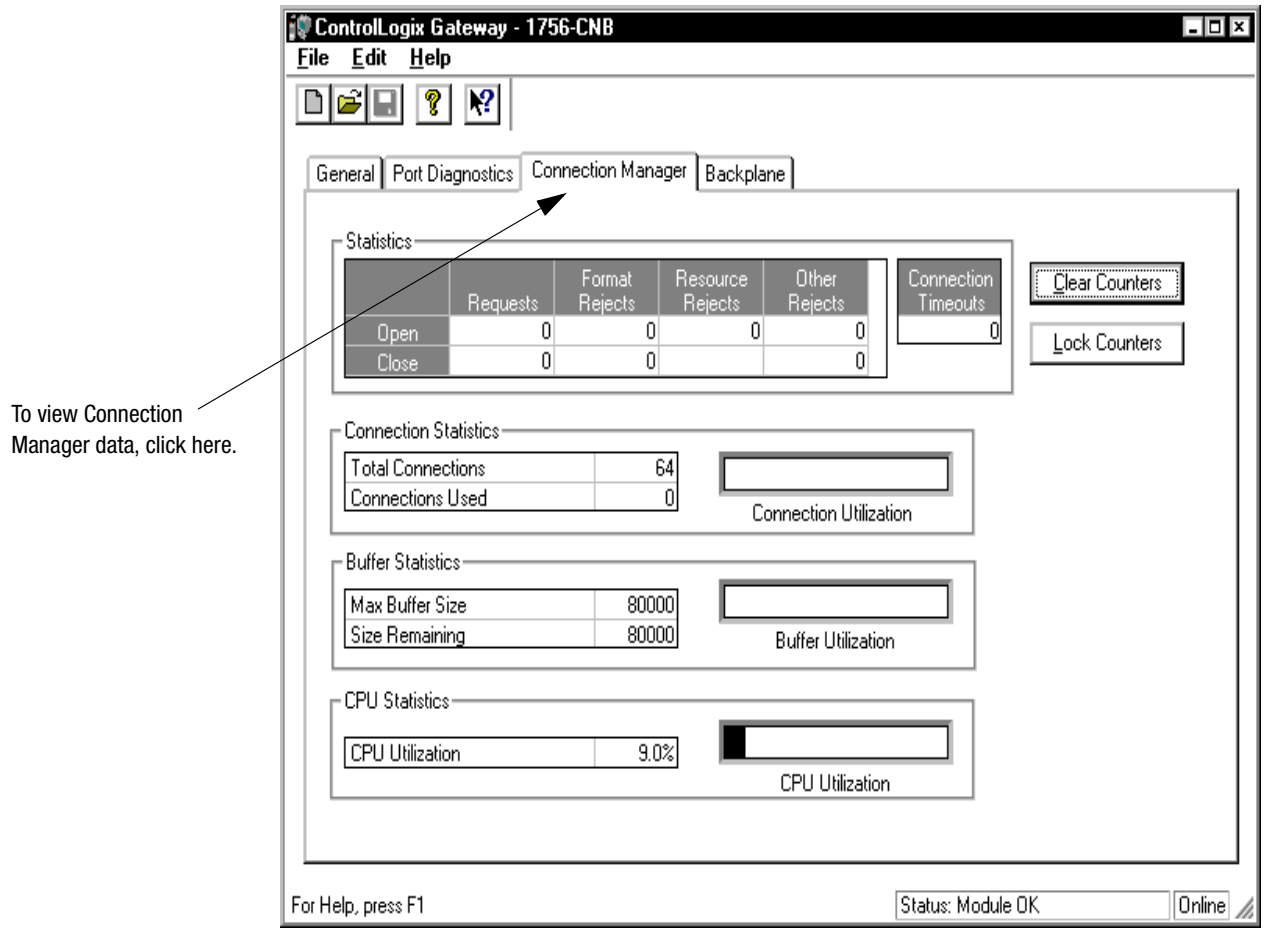
This chapter describes how to view *Connection Manager* diagnostic information.

About The Connection Manager

The Connection Manager provides information about the connections that are currently going through the module. You can view diagnostic-related information about the Connection Manager for the Ethernet and ControlNet modules by selecting the Connection Manager tab.

1. If it is not already started, start the configuration software, and select an Ethernet or ControlNet module.
2. Select the **Connection Manager** tab.

   You see a screen similar to the one below:



The Connection Manager provides the following connection information about your modules:

For this module	You can view this information
1756-ENET	Open/Close Statistics
	Connection Statistics
1756-CNB, -CNBR	Open/Close Statistics
	Connection Statistics
	Buffer Statistics
	CPU Statistics

For descriptions of the Connection Manager diagnostic counters for the 1756-ENET, 1756-CNB, and 1756-CNBR modules, refer to the ControlLogix Gateway Configuration Software online help or Appendix B. (For instructions on starting the help, see page 3–7.) The Connection Manager clear and lock counters buttons function in the same manner as these buttons do with channel diagnostics; see page 5-3 for information. Notice that the clear counters button only clears the items in the “Statistics” group.

What’s Next?

In the next chapter, we explain how to view backplane diagnostic information.

Viewing Backplane Diagnostic Information

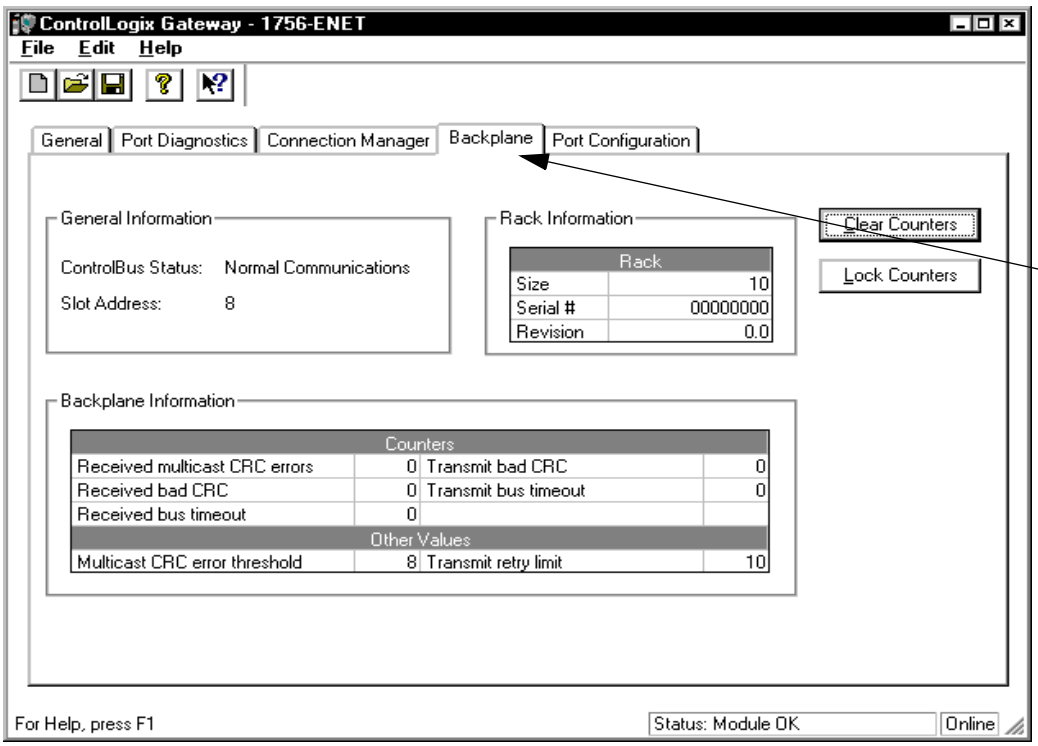
What's in This Chapter?

This chapter describes how to view backplane diagnostic information.

Viewing Information About The ControlLogix Backplane

You can use the configuration software to view general status, rack, and diagnostic-related information about the ControlLogix backplane.

1. If it is not already started, start the configuration software, and open a configuration file.
2. Select the **Backplane** tab.



For descriptions of the backplane diagnostic counters and instructions on clearing and locking the counter display, refer to the ControlLogix Gateway Configuration Software online help or Appendix B. For instructions on starting the help, see page 3–7.

What's Next?

In the next chapter, we explain how to change configuration information.

Changing a Module's Configuration Information

What's in This Chapter?

This chapter describes how to change a module's configuration information.

Changing a Module's Configuration Information

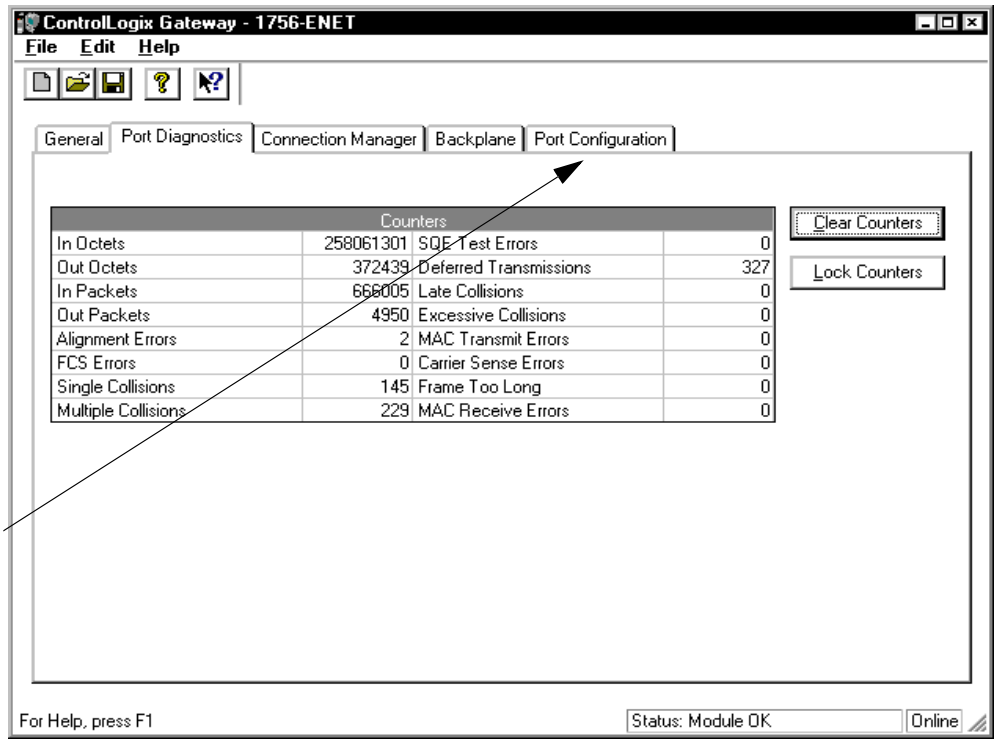
You can use the configuration software to change the configuration information you see on the General tab:

If you're using this module	And you want to	See this page
1756-ENET	configure the module	3–1
1756-DHRIO	configure the module	3–3

Configuring An ENET Module

1. Either on line or off line, from an Ethernet configuration file, select the **Port Configuration** tab.

   You see a screen similar to the one below:



To select the Port Configuration tab, click here.

2. Verify that you are using a Bootp server:

What's a Bootp server?
Bootp (Bootstrap protocol) is used to boot diskless nodes, such as 1756-ENET. The Bootp server supplies the IP address, subnet mask, and Ethernet gateway address.

If you are	Go to this step
using a Bootp server	2a
not using a Bootp server	4

a. Select the **Enable Bootp** checkbox.

(This is a toggle checkbox. When Bootp is enabled, the checkbox is selected; otherwise, Bootp is disabled.)

b. Click on **Apply**.

3. You have now configured your 1756-ENET module for use with a Bootp server.

For more information on configuring a Bootp server, refer to the Ethernet Communication Interface Module User Manual, publication 1756-6.5.1.
For a complete list of related publications, refer to page 3–2 in this manual.

4. Verify that the **Enable Bootp** checkbox is not selected. (Refer to step 2.)

5. Set the IP address:

What's an IP address?
An *IP address* is an Ethernet node's network address and denotes the network that the 1756-ENET module is located on and the physical address of the device.

a. Before you begin, check the IP address. Make sure your entry is in the form *xxx.xxx.xxx.xxx* where each *xxx* is a number between 0-255.

b. In the **IP Address field**, enter the appropriate IP address of the Ethernet module you are configuring. (To move between the fields, press the **Tab** key or ".")

6. Set a subnet mask:

What's a subnet mask?
A *subnet mask* identifies the bits of the internet address that correspond to the network and subnetwork portions of the address.

a. Before you begin, retrieve your subnet mask, if you have one. Make sure your entry is in the form *xxx.xxx.xxx.xxx* where each *xxx* is a number between 0-255.

b. In the **Subnet Mask** field, enter the appropriate subnet mask. (To move between fields, press the **Tab** key or ".")

7. Assign an Ethernet gateway address:

What's an Ethernet gateway address?
A gateway is a shared connection between two networks. It consists of hardware and software which performs protocol conversions. An *Ethernet gateway address* is the IP address of the Ethernet gateway you want the 1756-ENET module to use.

a. Before you begin, retrieve your Ethernet gateway address, if you are using one. Make sure your entry is in the form *xxx.xxx.xxx.xxx* where each *xxx* is a number between 0-255.

b. In the **Gateway Address** field, enter the appropriate gateway address. (To move between the fields, press the **Tab** key or ".")

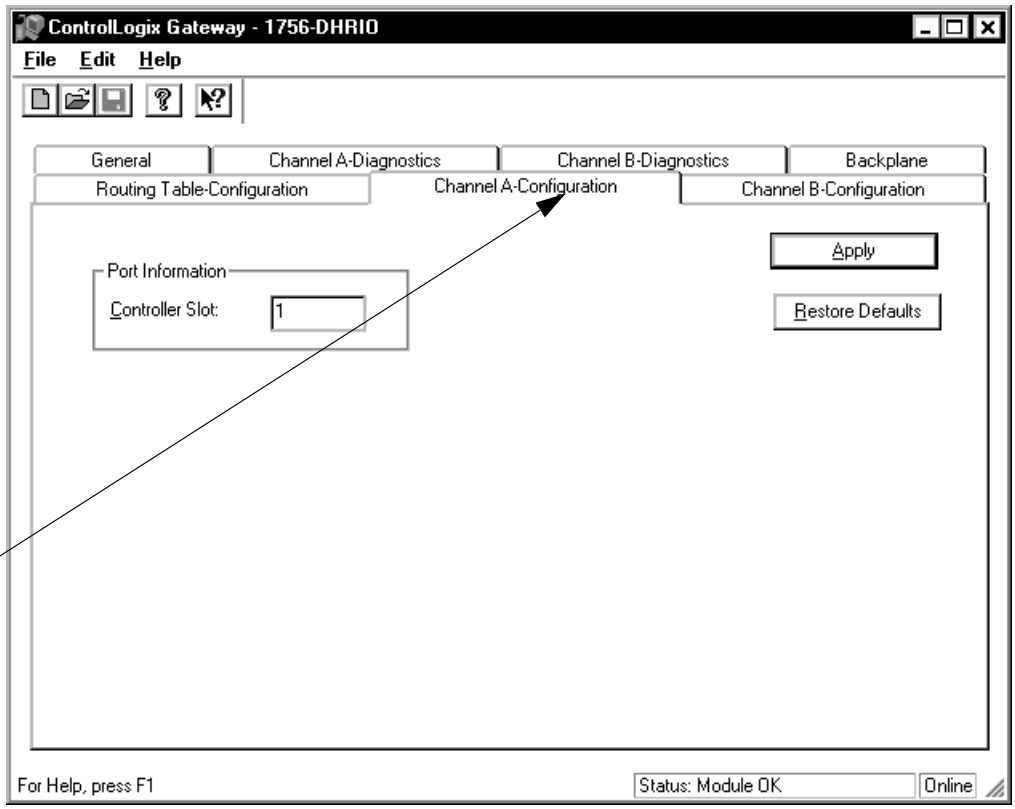
8. Click on **Apply**.

Configuring A DHRIO Module

When a Logix5550 controller is installed in the ControlLogix chassis, it can act as a programmable controller directly attached to the DH+™ network (like a PLC-5® processor does). That is, the DHRIO module will forward any local messages it receives on the DH+ network to the slot containing the Logix5550 controller. Since there can be more than one controller in a chassis, and they can be in any slot in the ControlLogix chassis, the DHRIO module needs to know which slot the local controller is in. We refer to this slot as the *controller slot*.

1. From a DHRIO configuration file, select a **Channel Configuration** (Channel A or Channel B) tab.

   You see a screen similar to the one below:



To select a Channel Configuration tab, you you can click here.

2. In the **Controller Slot** field, enter the appropriate slot number.

   Valid values are 0-16. The ControlLogix system begins slot numbering at 0 for the left-most slot The ControlLogix Gateway system currently supports four-, seven-, and ten-slot chassis. Future releases also include thirteen- and seventeen-slot chassis.

3. Click on **Apply**.

4. Repeat steps 1-4 for the other channel (channel A or channel B), since each channel can use a different controller.

   Important: If you choose to configure a channel for remote I/O communications, use RSLogix 5000 software to complete your configuration. See the ControlLogix DH+/Remote I/O Communication Interface Module User Manual, publication number 1756-6.5.14, for additional information.

   Important: For channels that you configure for remote I/O communications in the configuration software, you cannot display channel configuration or channel diagnostics tabs. You can still display general, backplane, and/or routing table tabs.

What's Next?

In the next chapter, we explain how to design and enter a routing table.

Designing a Routing Table

What's in This Chapter?

This chapter describes how to design a routing table.

Designing a Routing Table

Before you can design and enter a routing table, you need to understand what a routing table is . . .

Reading This Routing Table Tutorial

If you are familiar with routing tables and want to skip this tutorial and create your own routing table, go to "Entering A Routing Table," on page 9–11.

Why Do We Need a Routing Table?

DHRIO Configuration and Link IDs. The DH+ protocols do not use CIP. Therefore, the DHRIO module, as the entry point into the ControlLogix architecture from the DH+ network, is the source and must be provided a full route to deliver a message from the DH+ network through the ControlLogix architecture to the destination. Therefore, you must configure each DHRIO module with a routing table that specifies the route through that module to each link ID that will receive messages via that module. This is accomplished by assigning link IDs for all networks (including Ethernet and ControlNet) that will be routing information through this DHRIO module. Link IDs are numbers (1-199) assigned to a communication cable (Ethernet, ControlNet, DH+ or the ControlLogix backplane).

What Is a Routing Table?

DH+ module addressing has been provided via the link ID and node address. To configure a DHRIO module, you must provide a path or route, which specifies a "map" to other links in the system. To do this, you must set up a *routing table*. The routing table translates link ID and node address information into path or routing information. Routing tables are set up at each node to build accurate connections.

The ControlLogix Gateway supports Pyramid Integrator (PI) routing and is backward-compatible with existing DH+ products. It also provides newer routing protocols which are designed to make it easier for you to maintain a system. The DHRIO module has added configuration which allows the ControlLogix Gateway to use these new protocols while at the same time also be backward-compatible with existing DH+ products.

The configuration for each module in the ControlLogix system is completely contained within that module; there is no central repository, as there is in the Pyramid Integrator system. Therefore, you use the configuration software to configure *each* ControlLogix chassis and *each* DHRIO module in the chassis. To help make this task easier, the configuration software lets you put the same routing table into *all* the DHRIO modules that are in the same chassis with the module currently being configured.

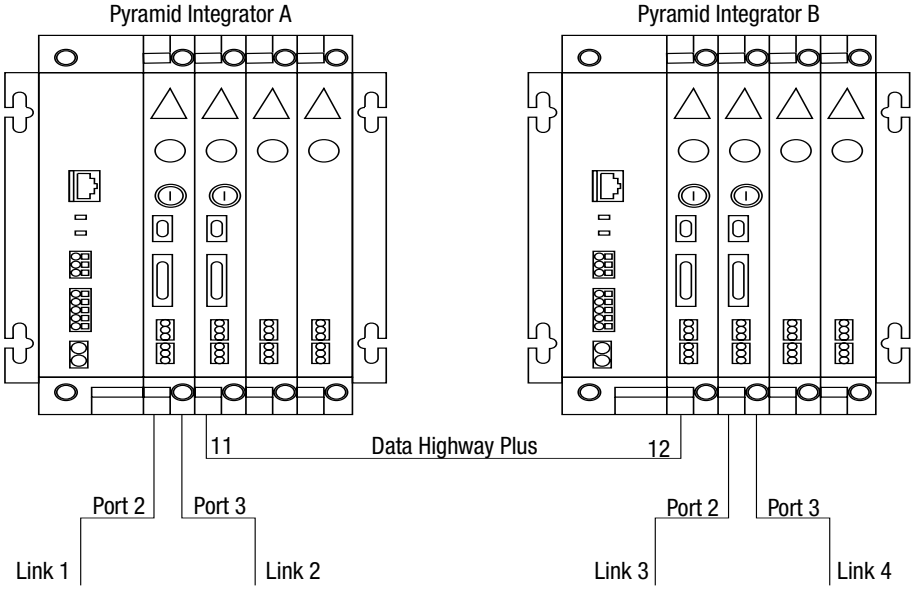
Pyramid Integrator Emulation. Each Pyramid Integrator chassis has a routing table in it that tells the chassis where each DH+ link is in relation to that chassis. The routing table uses a *link ID* to identify each link. You must enter a port for each link that is local to that chassis and a *bridge address* for each link that is remote from that chassis.

In the ControlLogix system, you'll complete the same tasks; however, the presentation is graphical instead of tabular.

You must assign each link ID that is local to the module and channel in the ControlLogix Gateway being configured, and add a bridge module to the appropriate DH+ channel for each remote chassis. Each bridge can have a list of link IDs that are accessible through that bridge. A bridge can be any device that supports the Pyramid Integrator style of routing, including:

- Pyramid Integrator
- ControlLogix Gateway
- WinLinx Gateway
- RSLinx workstation hosting DDE topics or applications that accept unsolicited messages

For example, if you have this Pyramid Integrator system:



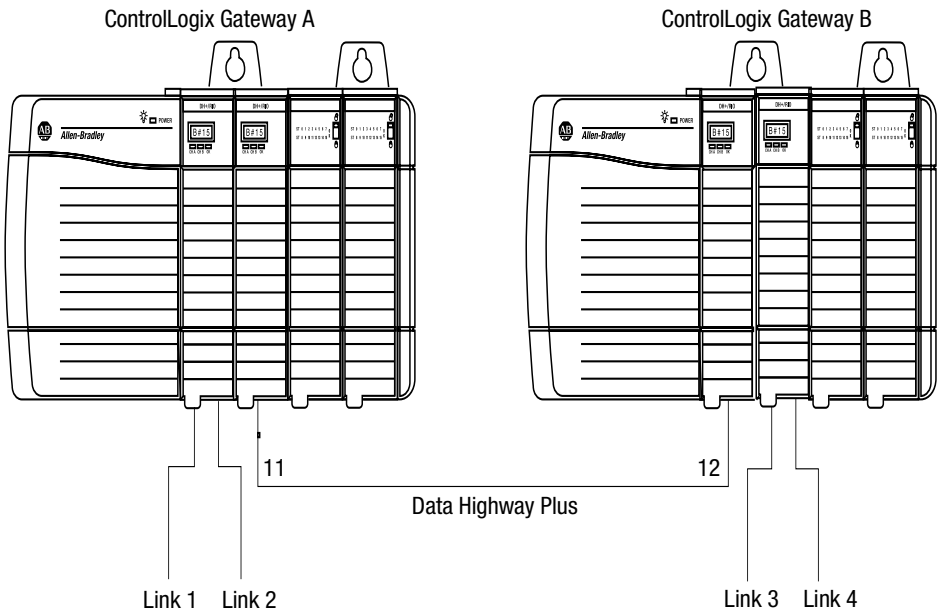
and system A has a routing table that looks like:

Link ID	Module and Port	Type	Bridge
1	1KA-2	Local	
2	1KA-3	Local	
3	2KA-2	Remote	12
4	2KA-3	Remote	12

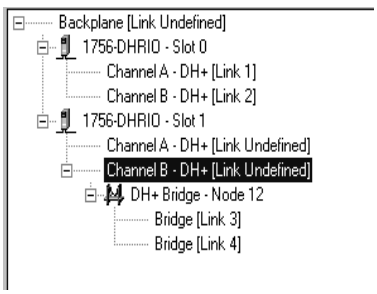
and System B has a routing table that looks like:

Link ID	Module and Port	Type	Bridge
1	1KA-2	Remote	11
2	1KA-3	Remote	11
3	2KA-2	Local	
4	2KA-3	Local	

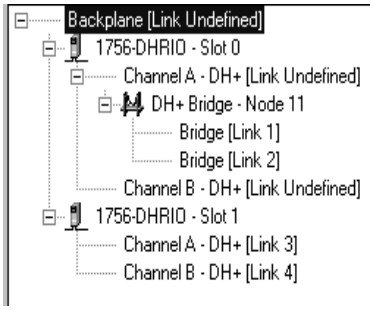
and you want to do the equivalent routing (via the DH+ network) with the ControlLogix Gateway system that looks like:



then the equivalent routing table in the ControlLogix Gateway A is:


Backplane [Link Undefined]
1756-DHRIO - Slot 0
Channel A - DH+ [Link 1]
Channel B - DH+ [Link 2]
1756-DHRIO - Slot 1
Channel A - DH+ [Link Undefined]
Channel B - DH+ [Link Undefined]
DH+ Bridge - Node 12
Bridge [Link 3]
Bridge [Link 4]

and Gateway B is:


Backplane [Link Undefined]
1756-DHRIO - Slot 0
Channel A - DH+ [Link Undefined]
DH+ Bridge - Node 11
Bridge [Link 1]
Bridge [Link 2]
Channel B - DH+ [Link Undefined]
1756-DHRIO - Slot 1
Channel A - DH+ [Link 3]
Channel B - DH+ [Link 4]

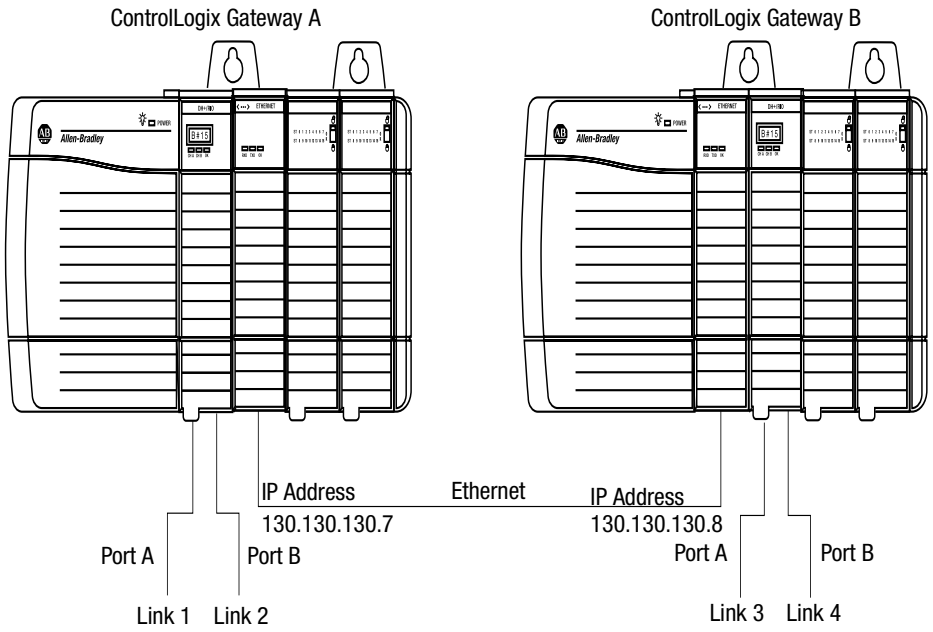
ControlLogix Routing. The ControlLogix routing protocols use the *Control and Information Protocol (CIP)*. CIP is a message-based protocol that implements a relative path to send a message from the source device in a system to the destination device. In this way, the source device in a networks system contains the path information that steers the message along the proper route to reach its destination. Since the source device holds this information, other devices along the path simply *pass* this information; they do not need to *store* it. This has two significant benefits:

- You do not need to configure routing tables in the *bridging* module, which greatly simplifies maintenance and module replacement
- You maintain full control over the route taken by each message, which enables you to select alternative paths for the same end device

▶ Configuring DHRIO modules

Example 1. In practice, you have to do this only once for each ControlLogix chassis; the configuration software can send the same routing table to each module in the chassis.

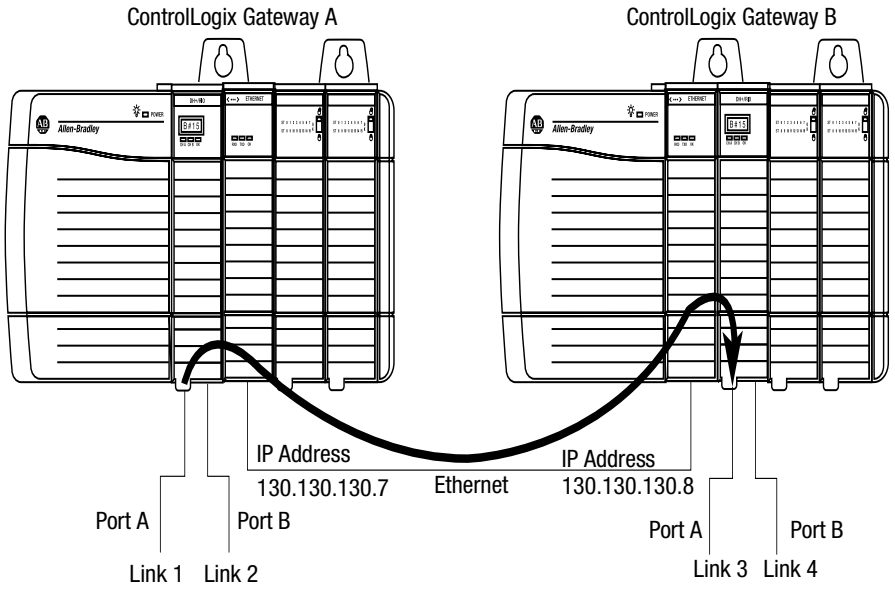
Given the physical system shown below, let's configure the routing information in the DHRIO module in Gateway A.



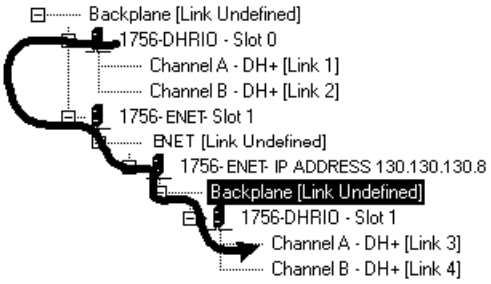
For example, we need to tell the DHRIO module on the left the path we want a message to take from Link 1 to Link 3. Let's draw that path in the physical diagram and write out each step the message will take along that path. Let's write out the path to link 3:

1. Start at the DHRIO module in Gateway A.
2. Go over the backplane
3. Go to the ENET module in slot 1.
4. Go out onto the Ethernet network.
5. Go to the ENET module at IP address 130.130.130.8 in Gateway B.
6. Go over the backplane.
7. Go to the DHRIO module in slot 1.
8. Channel A is Link 3.

We illustrate these steps as:



The routing table for this example looks like this:


Backplane [Link Undefined]
1756-DHRIO - Slot 0
Channel A - DH+ [Link 1]
Channel B - DH+ [Link 2]
1756-ENET Slot 1
ENET [Link Undefined]
1756-ENET IP ADDRESS 130.130.130.8
Backplane [Link Undefined]
1756-DHRIO - Slot 1
Channel A - DH+ [Link 3]
Channel B - DH+ [Link 4]

To create the routing table for this example:

To create this path segment	Do this
Start at the DHRIO module in Gateway A.	**1.** To connect to the DHRIO module that is in slot 0 of Gateway A, from the **File** menu, select **Browse Network**. **2.** Select the module. **3.** If you are offline, from the **File** menu, select **New**. **4.** Select the **Routing Table - Configuration** tab. If there is a routing table already configured for the module, select Restore Defaults.
Go over the backplane	**5.** To place the ENET module in the routing tree diagram, click on the backplane to select it.
Go to the ENET module in slot 1.	**6.** To add the ENET module, from the **Edit** menu, select **Add Module**. **7.** Select 1756-ENET module, and click on OK. **8.** Enter the slot number for the ENET module that you are adding. In this case, it is 1. It is not necessary to assign a link ID for the Ethernet link since we will not be addressing any PLC-5 processors on that Ethernet link. (Leave the link ID at zero). **9.** Press OK.
Go out onto the Ethernet network.	**10.** So you can enter the ENET in the other ControlLogix Gateway, click on the ENET link (not the ENET module).
Go to the ENET module at IP address 130.130.130.8 in Gateway B.	**11.** To add the other ENET module, from the **Edit** menu, select **Add Module**. **12.** Select 1756-ENET module, and click on OK. **13.** Enter the IP address (130.130.130.8, in this case) of the ENET module being added. It is not necessary to assign a link ID for the backplane since we will not be addressing any controllers on that backplane. (Leave the link ID at zero). **14.** Press OK.
Go over the backplane.	**15.** To place the other DHRIO module, click on the backplane just added.
Go to the DHRIO module in slot 1.	**16.** To add the other DHRIO module, from the **Edit** menu, select **Add Module**. **17.** Select 1756-DHRIO, and click on OK **18.** Enter the slot number (1, in this case) of the DHRIO module being added.
Channel A is link 3.	**19.** Enter the link IDs for its two ports. (Port A is Link 3 and Port B is Link 4, in this example.) **20.** Press OK.

Example 2.Given the physical system shown below, let's configure the routing information in the DHRIO module in the ControlLogix Gateway. In this example, configure the routing table so that you can send a message from the PLC-5 processor on DH+ to the PLC-5E Ethernet processor. The message will originate at the PLC-5 and must be configured as a remote message, where the destination link ID=12 and the destination Node number is 0.

1. Start at the DHRIO module in slot 0 of the ControlLogix Gateway.

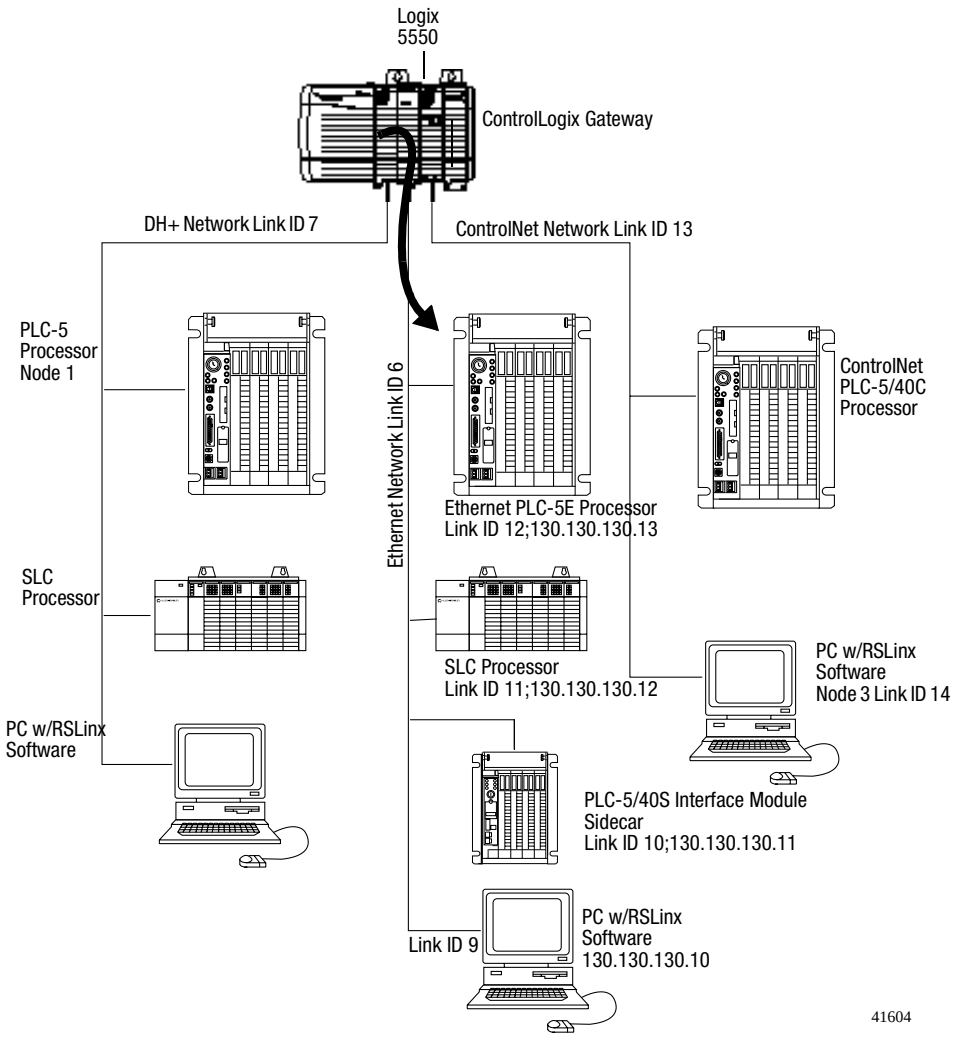
2. Go over the backplane

3. Go to the ENET module in slot 1.

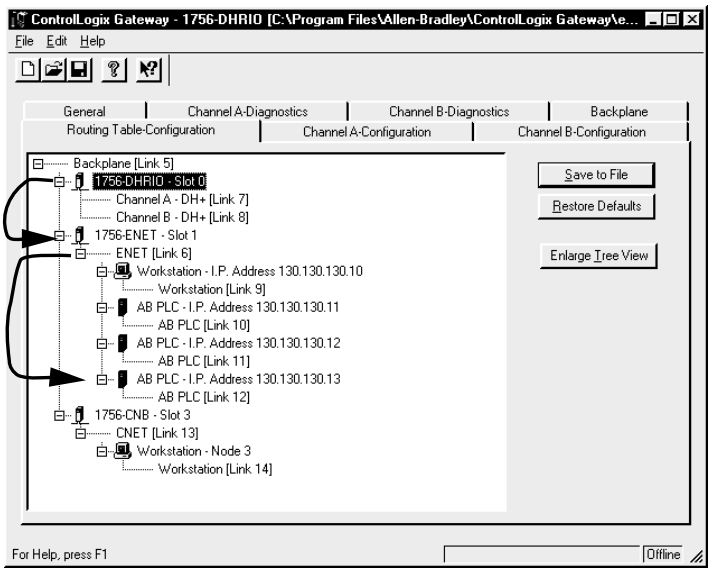
4. Go out onto the Ethernet network.

5. Go to the ENET module at IP address 130.130.130.13.

We illustrate these steps as:



The routing table for this example looks like this:



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In this example, the PLC-5 processor is connected to a DH+ link that is connected to a 1756-DHRIO module. This processor can send a remote DH+ message to the Ethernet PLC-5 processor, the SLC processor, or the PLC-5 Ethernet interface module via the ControlLogix Gateway. This processor can also receive remote messages from the same devices via the ControlLogix Gateway. The link ID for the AB PLC icon specifies the addressing information that the 1756-DHRIO module needs to successfully route messages in both directions.

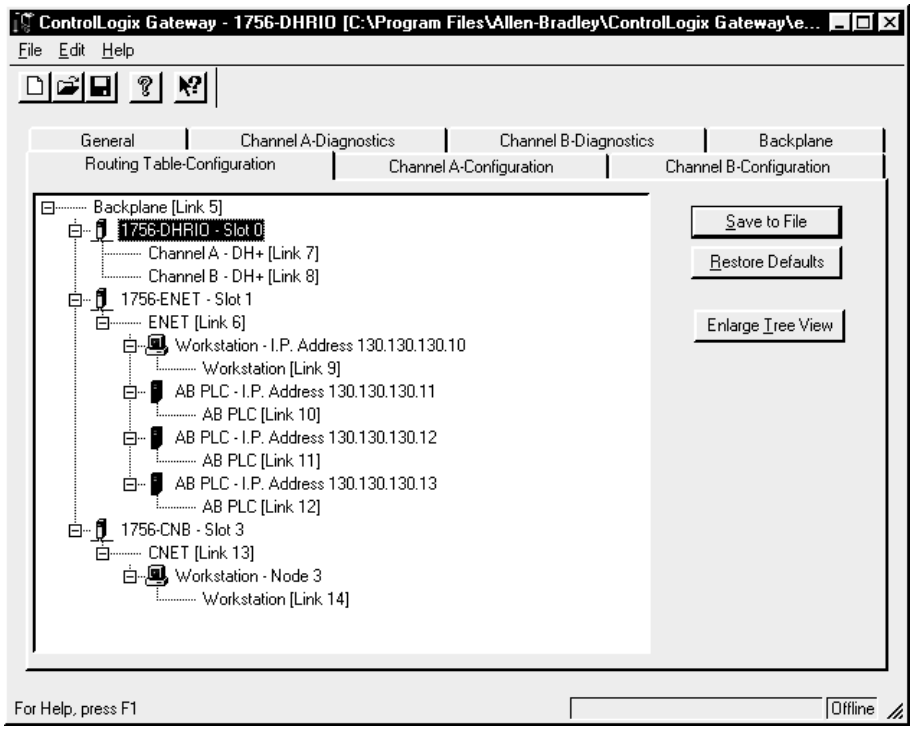
To create the routing table for this example follow the steps in this table:

To create this path segment	Do this
Start at the DHRIO module in the ControlLogix Gateway.	**1.** If you want to configure the routing table *ONLINE*, connect to the DHRIO module that is in slot 0 of the ControlLogix Gateway. Do this by selecting the **F**ile menu, and then selecting **B**rowse Network. **2.** Navigate through the network and select the DHRIO module. **3.** Select the **Routing Table - Configuration** tab. If there is a routing table already configured for the module, select Restore Defaults. **4.** If you want to configure the routing table *OFFLINE*, from the **F**ile menu, select **N**ew. Choose to create a 1756-DHRIO module type. **5.** Select the **Routing Table - Configuration** tab.
Go out to the backplane	**6.** To place the 1756-ENET module in the routing tree diagram, click on the backplane so that it is highlighted.
Go to the ENET module in slot 1.	**7.** To add the 1756-ENET module, from the **E**dit menu, select **A**dd Module. **8.** Select 1756-ENET module, and click OK. **9.** Enter the slot number for the ENET module that you are adding. In this case, it is 1. Enter the Link ID of the Ethernet Link. In this case it is 6. Press OK.
Go out onto the Ethernet network.	**10.** In order to enter the AB-PLC's on the Ethernet link, click on the ENET link (not the ENET module), so that it is highlighted.
Go to the ENET module at IP address 130.130.130.13	**11.** To add the AB PLC module types, from the **E**dit menu, select **A**dd Module. **12.** Select the AB PLC module type, and click on OK. **13.** Enter the IP address (130.130.130.13, for the PLC-5/E in this case) of the ENET module being added. Enter the Link ID of the AB PLC (12, for the PLC-5/E in this case). Press OK. *Repeat this process for each AB PLC module type, as well as Workstations and other 1756-ENET modules.*
Continue configuring the DH+ Network.	**14.** Select the 1756-DHRIO module and verify that it is highlighted. From the **E**dit menu, select **Module Information**. If you are configuring OFFLINE, enter the slot number of the DHRIO module. If you are configuring ONLINE, the slot number is already filled out. **15.** Enter the Link ID number for Channel A, which in our case is 7.

Entering a Routing Table

Once you design a routing table, follow these steps to enter it into a DHRIO module:

1. Select the **Routing Table - Configuration** tab.



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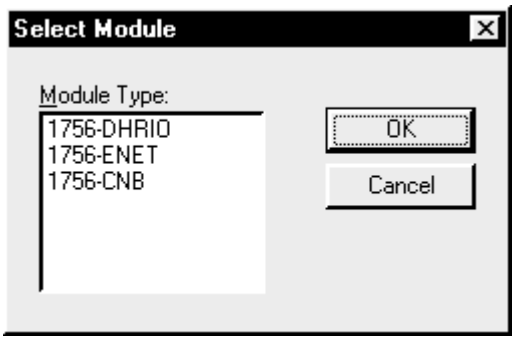
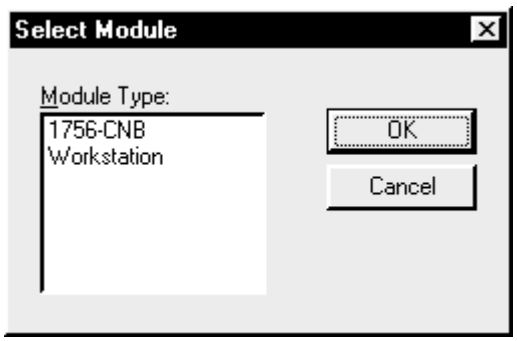
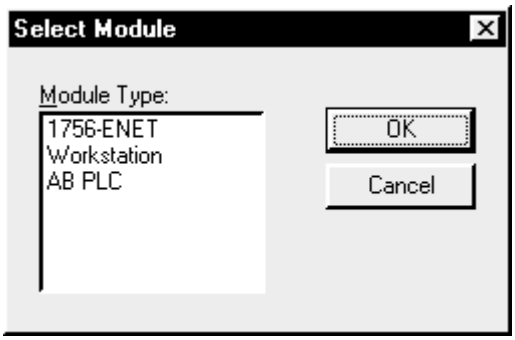
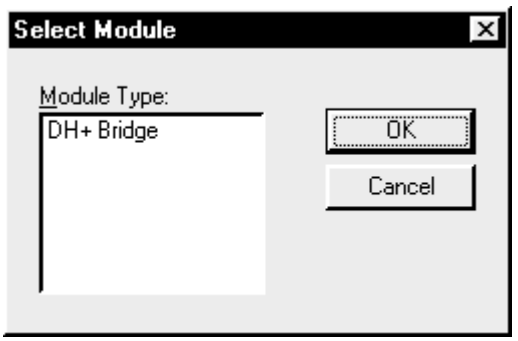
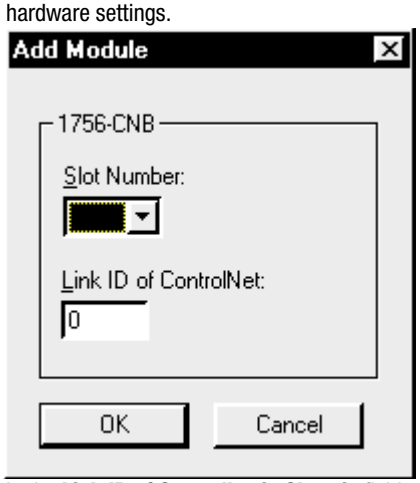
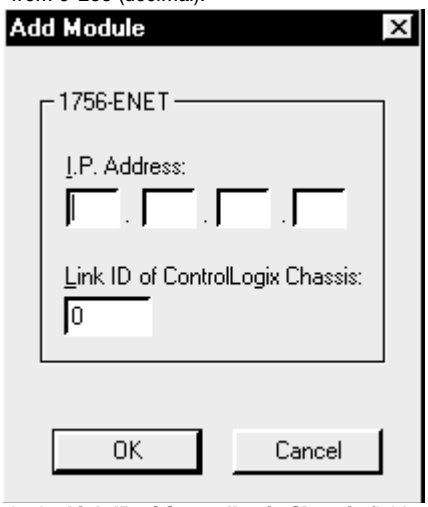
▶ If you right-click the mouse, the routing table editor provides a menu of the editing options you can use.

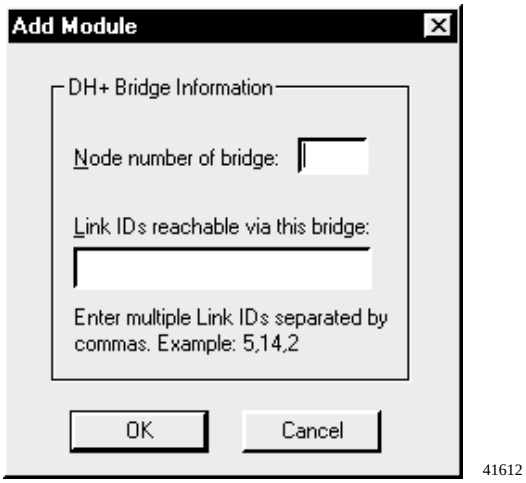
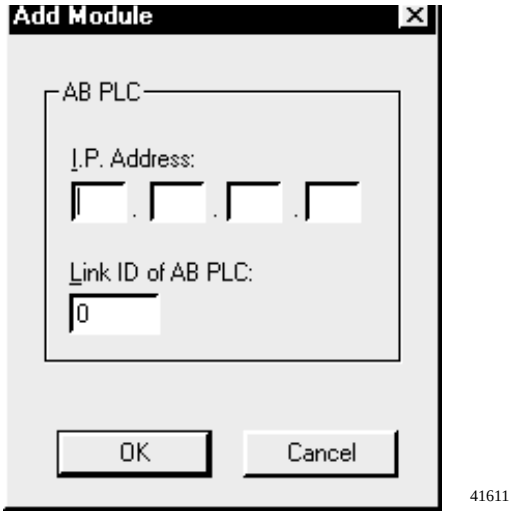
2. Select the link or backplane to which you want to add a module.
3. From the **Edit** menu (or right-mouse menu button), select **Add Module**.

If you are adding a module to	You see this dialog box
the ControlLogix backplane	 41613
a ControlNet link	 41614
an Ethernet link	 41616
a DH+ link	 41615

4. In the **Select Module** dialog box, select the module type for the module you want to add, and click on OK.

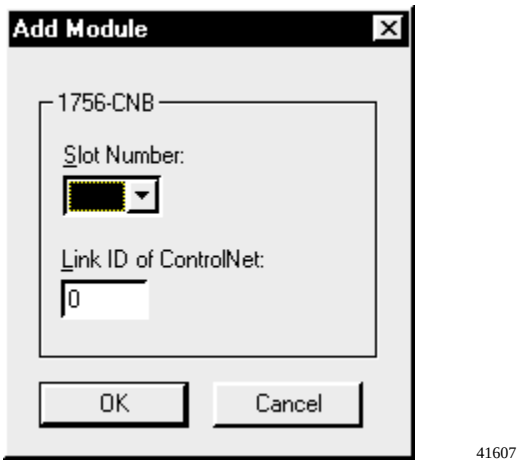
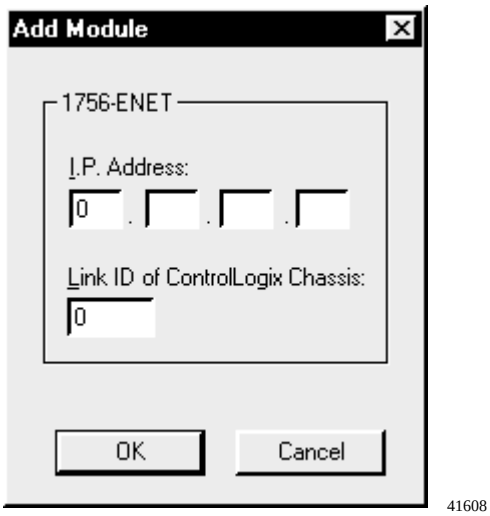
5. If you are adding a module to a link, select from the following table. If you are adding a module to the ControlLogix backplane, select from the table on page 9-11.

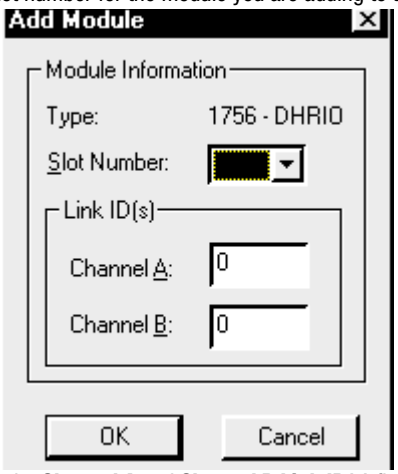
If you are	Do this
adding a ControlNet module	1. In the **Add Module** dialog box, in the **Network Address** field, type the module's network address. Valid values are 0-99 (decimal). Make sure the selected value corresponds to your hardware settings.  41610 2. In the **Link ID of ControlLogix Chassis** field, type a link ID for the link on the other side of the module. Valid values are 1-199 (decimal). 3. Click on OK.
adding an Ethernet module	1. In the **Add Module** dialog box, in the **I.P. Address** field, type an IP address. Valid values are *xxx.xxx.xxx.xxx* where *xxx* is a number from 0-255 (decimal).  41609 2. In the **Link ID of ControlLogix Chassis** field, type a link ID for the link on the other side of the module. Valid values are 1-199 (decimal). 3. Click on OK.

If you are	Do this
adding a DH+ module	**1.** In the **Add Module** dialog box, in the **Node number of bridge** field, type a station address. Valid values are 0-77 (octal).  41612 **2.** In the **Link IDs reachable via this bridge** field, type any link IDs. Valid values are 1-199 (decimal). **3.** Click on **OK** .
adding an AB PLC module	**1.** In the **Add Module** dialog box, in the **I.P Address** field, type an I.P. address.  41611 **2.** In the **Link ID of AB PLC** field, type the link ID of the AB PLC. Valid values are 1-199 (decimal). **3.** Click on **OK**
adding a module to the ControlLogix backplane	Go to page 9-15.

Important: If you do not want to assign a link ID, enter 0. DH+ bridge modules allow a list of link IDs to be entered. Link IDs are all the links that can be reached through that bridge. Each link ID in a system must be unique. Workstations can have a link ID that is used to deliver unsolicited requests to applications on that workstation, where each application has its own station address.

If you are adding a module to the backplane:

To add this module type	Do this
ControlNet	**1.** In the **Add Module** dialog box, in the **Slot Number** field, type the slot number for the module you are adding to the chassis.  **2.** In the **Link ID of ControlNet** field, type the link ID for the ControlNet link. Valid values are 1-199 (decimal). **3.** Click on **OK**.
Ethernet	**1.** In the **Add Module** dialog box, in the **Slot Number** field, type the slot number for the module you are adding to the chassis.  **2.** In the **Link ID of Ethernet** field, type the link ID for the Ethernet link. Valid values are 1-199 (decimal). **3.** Click on **OK**.

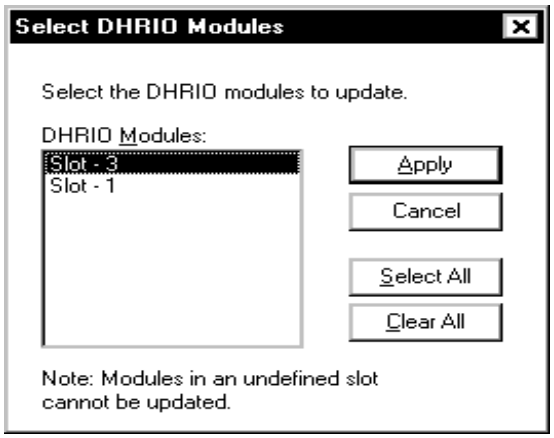
To add this module type	Do this
DH+	**1.** In the **Add Module** dialog box, in the Slot Number field, type the slot number for the module you are adding to the chassis.  41606 **2.** In the **Channel A** and **Channel B Link ID(s)** fields, type the link IDs for the DH+ channels. Valid values are 1-199 (decimal). **3.** Click on **OK**.

Important: If you apply your changes, you will have a chance to apply the routing table to all 1756-DHRIO modules within the same chassis as the 1756-DHRIO module you are configuring.

6. Repeat steps 2 through 5 for all of your edits.

7. To apply your changes to the module (if on line) or the file (if off line), click on **Apply**.

If you have more than one DHRIO module in the root chassis, the software will prompt you to identify which modules should receive the new routing table.



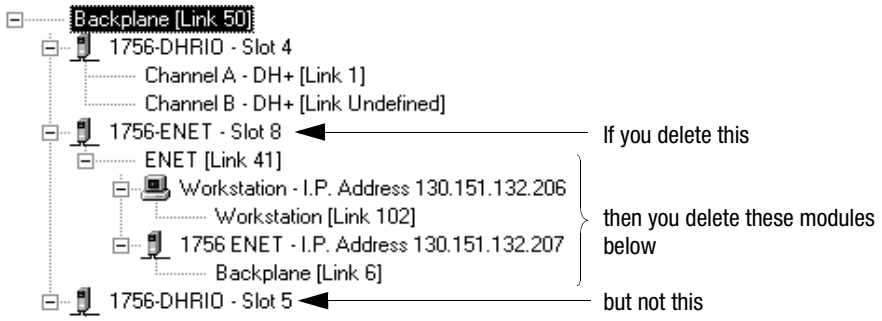
Deleting Modules from the Routing Table

To delete a module (and any modules “below” it - see tip) from the routing table:

1. In the DHRIO interface, select the **Routing Table - Configuration** tab.
2. Select the module that you want to delete.

   You cannot delete the DHRIO module that is currently being configured.
3. From the **Edit** menu, select **Delete Module**.
4. To delete the module (and any existing modules “below” it - see tip), select **Yes**.

▶ Routing tables are drawn to show hierarchy; thus, a module “below” another module is shown as a subset of that module. See below.


Backplane [Link 50]
1756-DHRIO - Slot 4
Channel A - DH+ [Link 1]
Channel B - DH+ [Link Undefined]
1756-ENET - Slot 8
If you delete this
ENET [Link 41]
Workstation - I.P. Address 130.151.132.206
Workstation [Link 102]
1756 ENET - I.P. Address 130.151.132.207
Backplane [Link 6]
then you delete these modules below
1756-DHRIO - Slot 5
but not this

Changing the View

While configuring a routing table, you have two view options:

View	Description	Procedure
Default	This is the view that you see when you first open the routing table.	From the Enlarge Tree View, click on **Default View**.
Enlarge Tree	This view provides you with an enlarged view of the routing table. Use this view for easy manipulation of large network configurations. You must return to the default view to select a different tab.	From the **Routing Table - Configuration** tab, click on **Enlarge Tree View**.

What's Next?

In the following appendix, we list error and warning messages and provide some troubleshooting tips.

Interpreting Error and Warning Messages

What's in This Appendix?

This appendix alphabetically lists error and warning messages and provides some troubleshooting tips. The symbol "__" represents a parameter that is filled in by the configuration software during runtime.

If you encounter this error message	Do this
255 is not valid as the fourth field of the IP Address or Gateway Address.	Enter a proper address.
Adding a DHRIO module will exceed the maximum allowable number of branches of 203.	Reorganize your system to make the routing table smaller.
All or part of the path is invalid.	Check each node and slot number.
An error has occurred. The tool is unable to update the display.	Try to reconnect to the module.
An error occurred creating the file.	This is a Windows NT operating system error. Refer to that documentation for assistance.
An error occurred opening the selected file.	
An error occurred reading the modules NVS.	This is a communication error - check your cabling and power to the module, then retry communication.
An error occurred updating NVS.	
An error occurred updating the routing table.	
An error occurred while refreshing data from other tabs.	
An error occurred while sending the configuration file to the module.	
An error occurred writing to disk.	This is a Windows NT operating system error. Refer to that documentation for assistance.
An unspecified error occurred.	
Apply changes before closing tab?	Decide whether to send your changes to the module or file or to discard them.
Delete current module and all modules below it?	Make certain that you want to delete all modules accessed via this module.
File I/O error.	This is a Windows NT operating system error. Retry the operation; if necessary, reinstall RSLinx.
General error occurred while calling RSLinx.	
No module selected from RSWho.	Select a module by doubleclicking on it and proceed.
RSWho has returned an unusable path. Please select a different route to this module.	Only "Bridge Device" of "Remote ControlNet" can be used in the 1.7 version of RSWho.
The __ contains unexpected information and is unable to be used to create a display.	You may be using an older version of the software than the one you used to generate the configuration.
The actual routing information and the display information which is stored in the module are not consistent with each other. This can be caused by an interrupted "Apply" or by the module being moved since it was last configured. The tool will use the display information.	Decide whether the displayed information is correct. If it is, apply it. If it is not, correct it or send a saved configuration file to the module.
The checksum comparison failed.	Close the file and try the comparison again.
The configuration file does not contain a 1756-DHRIO module along with the backplane whose slot number matches the slot number of the module you are connected to. The configuration file will not be sent to the module.	Select the proper file for this module.
The disk is full.	Reassess your system needs.

If you encounter this error message	Do this
The end of file was reached.	This is a Windows NT operating system error. See that documentation for assistance.
The file could not be accessed.	
The file could not be located.	
The file is incompatible with this software.	You may be using an older version of the software than the one you used to generate the configuration.
The information displayed on this tab is only applicable when connected to a module.	You are using offline mode; use online mode to view this information.
The link ID is not within the valid range of (1 - 199).	Reassign the link ID within the valid range.
The link ID(s) of __ is (are) already used. Please choose a unique value between 1 - 199.	Each link ID in the routing table must be unique; you cannot make two routes to the same link.
The loopback address of 127.0.0.1 is not permitted.	Enter a proper IP address.
The module in slot __ is a __ module.	You specified a module that is not a DHRIO module as a DHRIO module in the routing table. Correct the routing table.
The module which you are currently connected to has stopped responding.	Check to ensure the following: •RSLinx is running and configured properly. •The module has not lost power. •All network cables remain connected.
The network address is not within the valid range of (0 - 99).	Enter a valid ControlNet network address.
The path for link ID __ exceeds the maximum path size. The link will not be added to the routing table.	Use a less complex route to the link.
The path to __ is missing information. The link will not be added to the routing table.	Provide the missing information and reapply.
The permitted number of open files was exceeded.	This is a Windows NT operating system error. Refer to that documentation for assistance.
The selected module is not supported by this tool.	Use RSWho to select one of the supported modules: •1756-DHRIO •1756-CNB, -CNBR •1756-ENET
The slot number you have selected is already being used. Please choose another.	Enter an unused slot number.
The station number is not within the valid range of (00 - 77) octal.	Enter a valid Data Highway Plus station address.
The value of the Controller Slot must be between 0 and 16.	Enter a valid configuration slot number.
There are currently __ branches in the routing tree control. The maximum number of branches allowed is 203.	Reorganize your system to make the routing table smaller.
There are no more directory entries.	This is a Windows NT operating system error. Refer to that documentation for assistance.
There was a hardware error.	
There was a sharing violation.	
There was an attempt to use an invalid file handle.	
There was an error trying to set the file pointer.	
This process can only update __ modules.	You have a DHRIO module in the routing table, but there is a different module in the physical chassis.
Unable to detect a module at the given path (__).	Reselect a module using RSWho.
Unable to establish communications with the module at address __.	
Unable to establish communications with the module in slot __.	You specified a module in the routing table that does not exist in the physical chassis.
Unable to establish communications with the module specified in slot __. the slot number is past the end of the physical rack.	You used a slot number that is larger than the physical rack.

If you encounter this error message	Do this
Waiting for response from RSWho...	Select a module in RSWho by double-clicking on it.
You have entered duplicate link IDs. Please enter unique link IDs.	Each link ID in the routing table must be unique; you cannot make two routes to the same link.
You have reached the maximum number (64) of links which can be defined for the routing table.	You must remove existing links before others can be defined.
You have selected a __ configuration file. You are currently connected to __ module.	Select a different file.
Zero is not valid as the first field of the IP Address or Gateway Address.	Enter a valid IP address.

Using Diagnostic Counters

What's in This Appendix?

This appendix provides descriptions of the diagnostic counters provided with the configuration software.

Using 1756-ENET Port Diagnostics

The Port Diagnostic tab provides the following counter information about your 1756-ENET module:

Diagnostic counter	Description
in octets	number of octets received by the module
out octets	number of octets sent by the module
in packets	number of packets received by the module
out packets	number of packets sent by the module
alignment errors	number of frames received that are not an integral number of octets in length
FCS errors	number of frames received that do not pass the FCS check
single collisions	number of successfully transmitted frames which experienced exactly one collision
multiple collisions	number of successfully transmitted frames which experienced more than one collision
SQE test errors	number of times the SQE TEST ERROR is generated
deferred transmissions	number of frames for which the first transmission attempt is delayed because the medium is busy
late collisions	number of times that a collision is detected later than 512 bit-times into the transmission of a packet
excessive collisions	number of frames for which the transmission fails due to excessive collisions
MAC transmit errors	number of frames for which the transmission fails due to an internal MAC sublayer error
carrier sense errors	number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame
frame too long	number of frames received that exceed the maximum permitted frame size
MAC receive errors	number of frames for which reception on an interface fails due to an internal MAC sublayer receive error

Using 1756-CNB(R) Port Diagnostics

The Port Diagnostic tab provides the following counter information about your 1756-CNB(R) module

Network Configuration

Diagnostic counter	Description
network update time	repetitive time interval in which data can be sent ton the ControlNet network
scheduled max network address	node with the highest network address that can use scheduled time on a ControlNet link
unscheduled max network address	node with the highest network address that can use unscheduled time on a ControlNet link
network address	node's address on the network

Media Status

Diagnostic counter	Description
channel A state‘	Status of channel A. Possible values are: • channel disabled • normal • temporary net error • media fault • bad net config • bade node config • self test • faulted unit
channel B state	Status of channel B. Possible values are: • channel disabled • normal • temporary net error • media fault • bad net config • bad node confi • self test • faulted unit

Counters

Diagnostic counter	Description
transmitted good	number of frames successfully sent from this module
received good	number of frames successfully received by this node
received bad	number of frames received by this module that aren't any good
total received	total number of frames received - both good and bad
transmitted aborted	transmission of a complete packet was aborted because the module couldn't supply data to the wire fast enough
received aborted	reception of a complete packet from the wire was aborted
update time overload	number of times NUT (network update time) times out
blockage	number of times that the message to transmit is larger than the time allowed for transmitting
channel A errors	number of frames received on channel A that were unusable independent of the active channel - channel selected for reception
channel B errors	number of frames received on channel B that were unusable independent of the active channel - channel selected for reception
noise detected	number of times that a start of frame could not be detected
mismatch events	number of times that a moderator frame was received with network parameters different from those in the receiving node
unheard occurrences	number of times a node transmits while another node is already transmitting, causing a collision
out of step events	number of times host node has inaccurate count of messages being transmitted and received
network silence	number of times node times out while waiting to hear from the moderator
collisions	number of times a node tries to transmit but can't because another node is already transmitting
commands received	number of commands received

Using 1756-DHRIO Channel Diagnostics

The Channel Diagnostic tab provides the following information about your 1756-DHRIO module:

Diagnostic counter	Description
messages successfully sent	message sent
messages successfully received	message received
commands successfully sent	command sent
commands successfully received	command received
replies successfully sent	reply sent
replies successfully received	reply received
received ACK/NAK w/bad CRC	received acknowledged or not acknowledged with bad CRC
timeout w/no ACKs received	timeout has expired with no acknowledged received
transmit retries exhausted	transmit retries have been exhausted
received NAKs illegal protocol	Not acknowledged. Illegal protocol operation received.
received NAKs bad LSAP	Not acknowledged. Bad Link Service Access Point received.
received NAKs no memory	Not acknowledged. No memory received.
received ACK/NAK too short	received an acknowledged or not acknowledged that is too short
received other than ACK/NAKt	received data other than acknowledged or not acknowledged
token pass timeout	token pass has timed out
token pass retries exhausted	token pass retries have been exhausted
claim token sequence entered	claim token sequence has been entered
token claimed	token has been claimed
received ASK/NAK too long	received an acknowledged or not acknowledged that is too long
received frame w/bad CRC	received bad CRC frame
transmitted NAK illegal protocol	Not acknowledged. Illegal protocol operation sent.
transmitted NAK bad LSAP	Not acknowledged. Bad Link Service Access Point received.
transmitted NAK no memory	Not acknowledged. No memory sent.
received frame too short	received frame is too short
received frame too long	received frame is too long
received transmission of a frame	received a transmission of a frame
received frame aborted	received frame has been aborted
replies could not be sent	replies that could not be sent
detected duplicate nodes	duplicate nodes found
detected duplicate tokens	duplicate tokens found
fatal lack of memory	lack of memory causes system to shut down
underrun	Contact your Rockwell Automation representative.

Using Connection Manager Diagnostic Counters

The Connection Manager tab provides the following information about your modules:

Statistics

Field	Description
requests	number of open/close connection requests this module has received
format rejects	number of open/close connection requests this module has rejected because the request was not formatted correctly or because some parameter value was not within a supported range of values
resource rejects	number of open connection requests this module has rejected because the module did not have enough resources (buffers, link bandwidth, or CPU utilization) to honor the request
other rejects	number of forwarded open/close connection requests a module rejects
timeouts	number of connections not explicitly closed by the connection originator, but closed by this module because they were not being used

Connection Statistics

Field	Description
total connections	total number of connections supported by this module
connections used	number of connections currently open to or open through this module
connection utilization graph	shows the percentage of connections used out of the total connections supported by this module

Buffer Statistics

Field	Description
max buffer size	total number of bytes that the module design has reserved for use by connections
size remaining	number of bytes currently unallocated to connections
buffer utilization graph	shows the percentage of buffer currently allocated to connections out of the total number of bytes that the module design has reserved for future use by connections

CPU Statistics

Field	Description
CPU utilization	amount of time currently being spent to support the existing connections and the background processing of the module
CPU utilization graph	shows the amount of time currently being spent to support the existing connections and the background processing of the module

Using the Configuration Software with RSWho

What's in This Appendix?

This appendix provides tips to help you use the configuration software with version 2.0 of RSWho more effectively.

Selecting a Module to Configure

Follow these tips to use the configuration software with version 2.0 of RSWho to select a module to configure.

1. Configure RSLinx.

   For each DH+ interface module in your workstation, configure the appropriate driver in RSLinx. For an Ethernet connection to the 1756-ENET module, configure a driver as follows:

For this driver	Enter this information
driver type	remote devices via Linx Gateway
device name	your choice
server's IP address or hostname	IP address of 1756-ENET module
server name	leave this blank
remote driver name	ASA

2. Select a module.

   a. Select **Browse Network** from the File menu of the configuration software to go on line with a module. Doing this starts RSLinx and invokes the RSWho function.

   b. Select the appropriate driver to exit your workstation.

   c. Navigate RSWho to get to the link or backplane for the module you want to configure.

   d. Double click on the module to select it.

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